November 12, 1945

STEEL

The Magazine of Metalworking and Metallurgy

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TECHNOLOGY DEPT.

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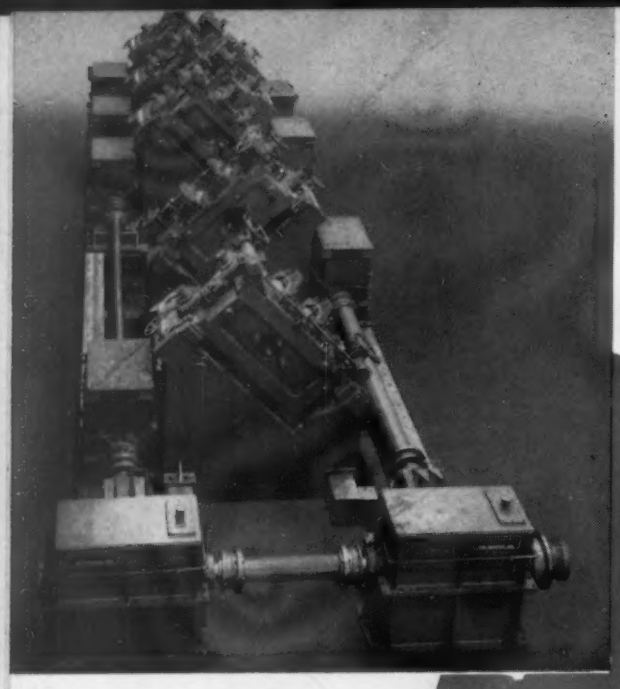
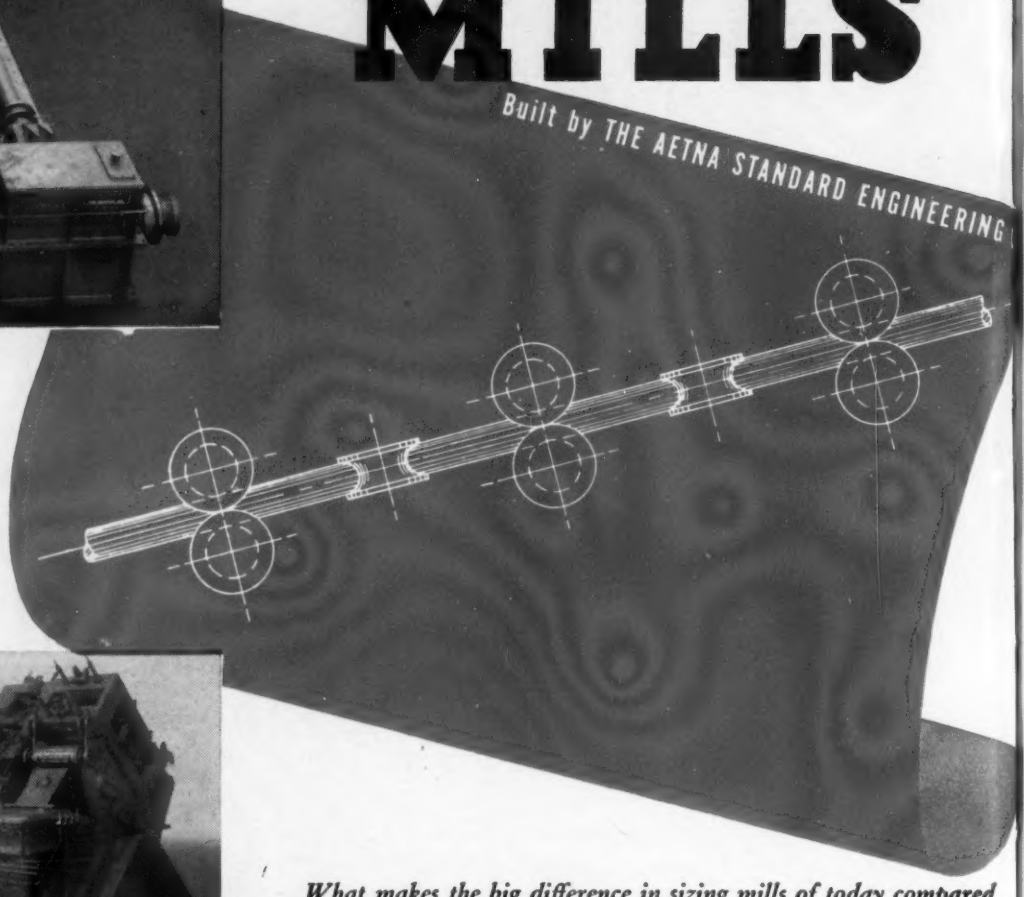
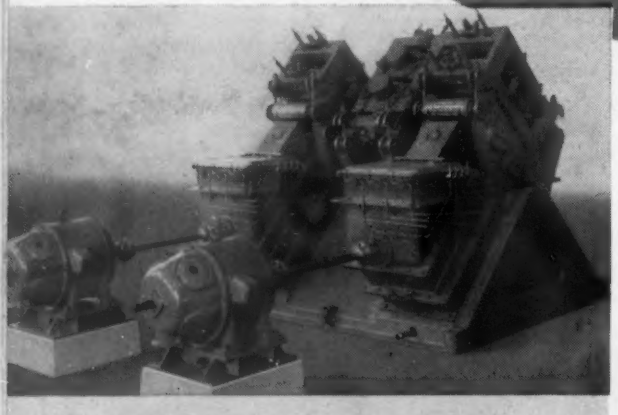


SIZING MILLS

Built by THE AETNA STANDARD ENGINEERING



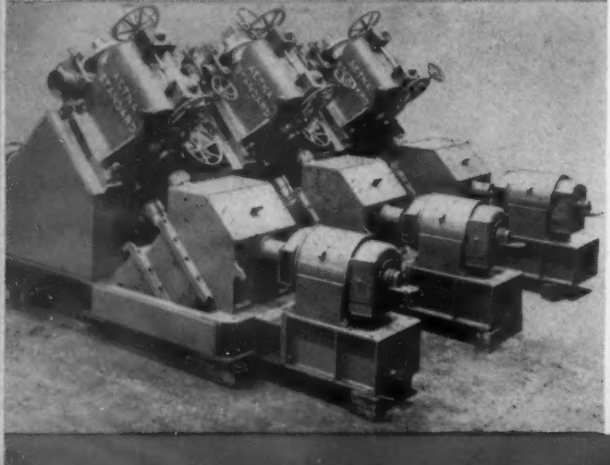
Aetna-Standard builds mills for sizing buttweld, lap weld, or seamless from 3/8" O. D. to 24" O. D. Aetna-Standard has two types of sizing mills . . . closed housing and overhang rolls.



Top—7-Stand sizing mill—28" dia. rolls for 12" O. D. tubes.

Above—3-Stand sizing mill—18" dia. rolls for 5" O. D. tubes.

Bottom—5-Stand sizing mill—24" dia. rolls for 8 5/8" O. D. tubes.



What makes the big difference in sizing mills of today compared with sizing mills of 15-20-25 years ago?

Now all shafts for rolls and drive are mounted in anti-friction bearings to maintain alignment of mill. Backlash is eliminated by use of universal spindles for connecting roll shafts to drive. A centralized grease system for the mill shafts and a circulating oil system for drives reduce maintenance and "down time" to a minimum. Another low maintenance factor is the heavy, rugged construction and the application of renewable hard liners on surfaces subject to wear.

These and other improvements in design make today's sizing mills much more efficient than the old models. Much closer O. D. tolerances can be produced and maintained. Roll adjustments have been greatly simplified, which reduces "down time" and manual labor.

All of which adds up to increased production, closer tolerances, better quality, and lower costs.

Aetna-Standard, exclusive manufacturer of seamless tube mills, makes more sizing mills than all other companies combined. Ask for sizing mill data based upon your requirements.

THE AETNA-STANDARD ENGINEERING COMPANY

YOUNGSTOWN, OHIO

DESIGNERS AND BUILDERS to the Steel, Non-Ferrous and Chemical Industries.

ASSOCIATED COMPANIES:

HEAD, WRIGHTSON & COMPANY, LIMITED, THORNABY-ON-TEES, ENGLAND

JOHN INGLIS COMPANY, LIMITED, TORONTO, ONTARIO, CANADA

"We make machinery, and need light steel sections in a variety of shapes and sizes. Are there economies in Bethlehem Cold-Formed Shapes?"

COLD-FORMED SHAPES *are the answer*

"We're in the market for a large quantity of material for jigs. Would Bethlehem Cold-Formed rectangular welded tubing work out?"

"Could Bethlehem supply a light section, punched with holes and painted?"

"The important factors in my product are uniformity and smoothness of surface. Wonder if I'd save with Bethlehem Cold-Formed Shapes?"

To all these questions, the answer is "yes." Bethlehem Cold-Formed Shapes, produced in an up-to-date shop, with a variety of rolls, presses, brakes and other equipment, are chalking up savings, in material and labor costs, for manufacturers of many types of products. Cold-Formed Shapes are proving themselves, showing marked advantages over other methods of forming, in dozens of applications we could tell you about (and will, gladly!).

Tell us about *your* metal-shaping problems. Let a Bethlehem representative advise you and furnish estimates, at no obligation. Our booklet on Cold-Formed Shapes is also yours for the asking. Get in touch with the nearest Bethlehem district office, or write to Bethlehem Steel Company, Bethlehem, Pa.

★ BETHLEHEM STEEL ★

WORLD'S LARGEST BUILDERS OF THE

world's largest cranes

STRIPPER CRANES

TOP—200 ton low head room push-pull screw type stripper removing mould from 90-ton ingot.

CENTER—Above stripper using stool loosening device with ingot gripped and raised by the extracting tongs.

BOTTOM—Exposed view of stool loosener showing projections on stripper links which holds down [shaped steel loosener.

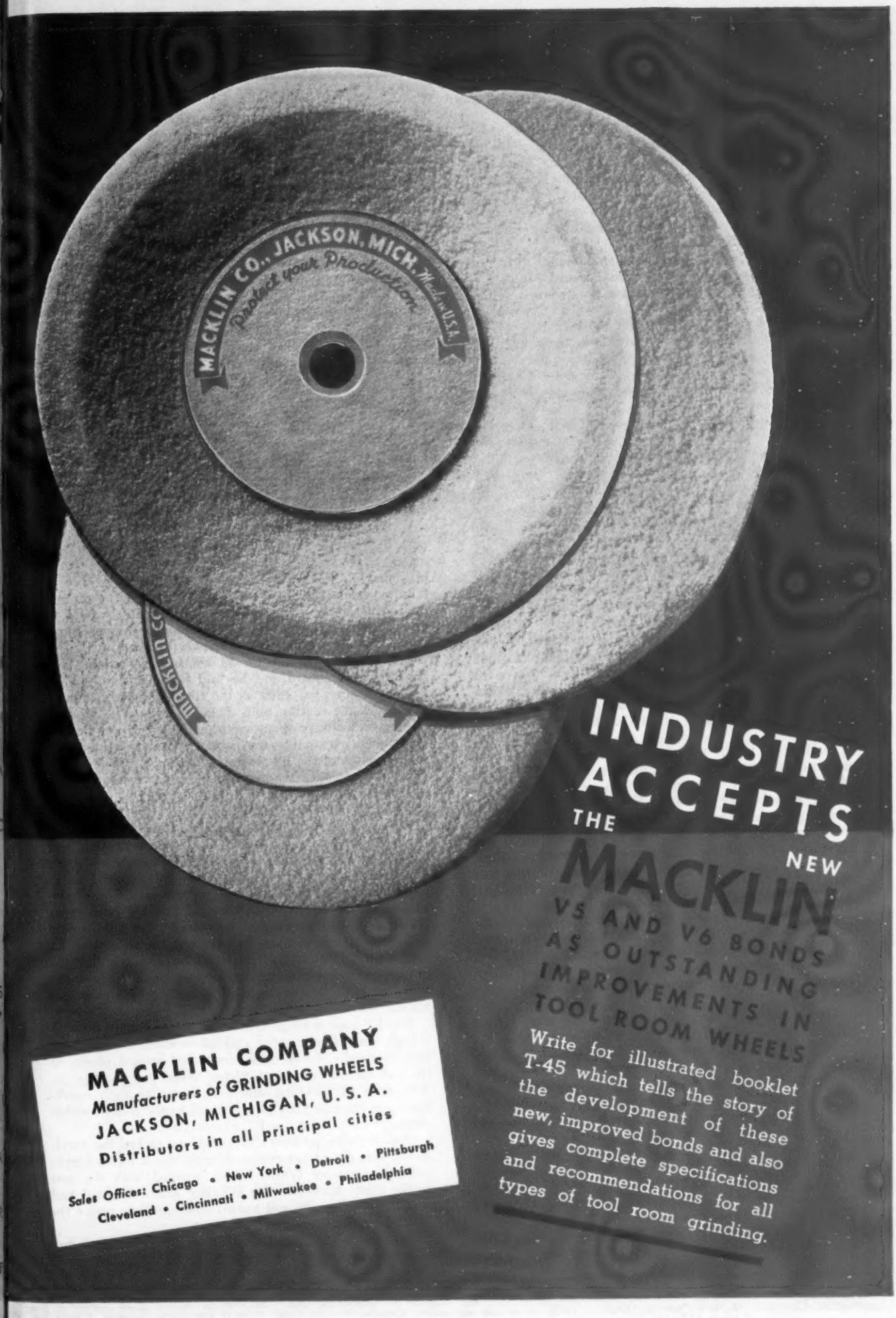
ARMY E NAVY

Alliance

THE ALLIANCE MACHINE CO.

ALLIANCE, OHIO

PITTSBURGH OFFICE • 1622 OLIVER BUILDING


MACKLIN CO., JACKSON, MICH. Made in U.S.A.
Protect your Production
INDUSTRY ACCEPTS
THE NEW
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V5 AND V6 BONDS
AS OUTSTANDING
IMPROVEMENTS IN
TOOL ROOM WHEELS
Write for illustrated booklet T-45 which tells the story of the development of these new, improved bonds and also gives complete specifications and recommendations for all types of tool room grinding.
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BEHIND THE SCENES

Art Allen Rides Again

In our capacity as Vice President in Charge of Riding Stuff we reported some months ago in this space our experiences galloping along the B&O from Washington, D. C., to Cumberland, Md., in the cab of a 4000-hp diesel-electric locomotive. Well, we've been at it again, only this time in one of the Navy's 80-ft experimental PT boats, No. 545 to be exact.

The occasion was a balmy Indian Summer afternoon a couple of weeks ago, when the Packard Motor Car Co. asked us to come along with a dozen other writers for an hour's test run on No. 545, which is powered, incidentally, by three of Packard's newest 1800-hp marine engines. We gathered along the dock near the Whittier Hotel in Detroit. The river was quiet and unruffled save for the furrows plowed by a steady stream of water commerce which funnels through this Great Lakes' bottleneck.

No. 545 hove into view, looking very black and rugged and menacing with guns and torpedoes in position. We clambered aboard after the Navy crew had made her fast, and greeted the skipper, Lieut.-Comm. "Bing" Williams and his assistant, Lieut. Scorville, a couple of able and healthy looking Joes who, along with their ten-man crew, were veterans of many a combat engagement with PT squadrons in the Pacific.

Engines idling, we eased out into the river and headed upstream into Lake St. Clair, meanwhile climbing down one of the three hatches to see what went on below deck. For a comparatively small boat, there is an amazing amount of equipment packed into the craft, including bunks, complete galley and eating quarters, shower baths, locker rooms and such. In the control room, half way between the lower level and the deck was a full complement of maps, radio equipment, as well as radarscope and related electrical accessories. All PT squadrons have been equipped with radar since 1943, we were told.

Coming up to the wheelhouse, which is entirely open to the elements except for a small windscreen just ahead of the wheelsman, we watched Skipper Williams slowly thrust forward the three control arms governing the speed of the engines which are carried aft in an engine hatch to permit short driveshafts to the three propellers. Next to the control levers are three tachometers and three pressure gages, providing readings on engine rpm and manifold pressures. Compass and a few other gadgets complete the navigational aids on the "bridge."

"Here we go," shouted the skipper as he opened the engines wide and the boat shot ahead with a lunge. Needles on the tachometers quivered up to around 2700, manifold pressure moved up to better than 50 lb as superchargers poured more air into the hungry intake manifolds.

One of the crew men said he guessed we were hitting around 44 knots, or better than 50 miles an hour. A wall of spray was thrown up on each side of the boat, while the boiling wake looked as though someone had scooped a hole in the lake. After clocking a mile run, Skipper Williams said he estimated we were averaging about 54 mph. Anyway, it was the fastest ride, and the windiest, we ever had on water.

Next came a few "hard to ports" and "hard to starboards" that had everybody grabbing for handrails, of which fortunately there were plenty. We cut figure eights all over the lake and had the crews of passing freighters gawking in amazement.

The PT boats are equipped for plenty of tough fighting. At first, they carried only .50-caliber machine guns in addition to the torpedoes slung in cradles along the sides. Later a 20-millimeter cannon was added, then a 37-millimeter cannon, then an 81-millimeter mortar, and finally twenty 4.5-inch rocket tubes. This assortment of firepower, plus the extreme speed and maneuverability, makes a lot of navy men prefer the PT boat to a destroyer.

Bill McComb, supervisor of field service in the Packard marine engine division, who has been following the development of PT boats since the first of Packard's 13,000 war-built marine engines were installed, told us something about the construction. Hulls are of wood, two layers of matched lumber with seams at right angles. Wood has the necessary resiliency to take a lot of twisting, pounding and vibration, which cannot be duplicated in metal. Aluminum hulls have been tried but were discarded. Steel has plenty of proponents, but so far the Navy cannot see it. When you consider the amount of drumming that might be set up inside a steel hull with a PT going at full tilt in a heavy sea, the Admirals are probably right.

Special 12-cylinder engines in No. 545 were of a new type perfected just before the end of the Japanese war. They provide 1800 horsepower each, against 1200 developed by the first marine engines and 1500 by those in production in the past few years. The boost was made possible by the addition of an after-cooler which, by means of water circulating through it, cools the mixture of supercharged air and high-octane gasoline before it is admitted to the intake manifold. Cooling the air reduces the volume to permit packing a greater weight of air into cylinders with the same supercharging pressure, and yields a 20 per cent horsepower increase.

Marsden Ware, director of marine engineering for Packard, was aboard and he said his engineers had by no means accepted 1800 as the top horsepower obtainable from the marine unit. Their experiments are continuing under navy sponsorship, and they expect further refinements eventually may boost the power up over the 2000 level. Already, by constant refinement and redesign, they have extended the overhaul period from around 200 hours to over 1000 hours, the navy currently standardizing on 750 hours for major overhauls.

We asked him what the critical components of the engine were as far as service life was concerned, and he said the usual things on gasoline engines — spark plugs, piston rings, bearings. Then we inquired as to what he thought about the gas turbine as a future possibility for a marine installation of the PT boat type. He smiled quickly and said he thought the turbine was definitely in the picture, and not too far off either. As soon as metallurgists and materials experts can lick the problem of suitable metals to operate continuously under stress at high temperatures, the small, high-power gas turbine will be a reality.

The PT boat is no pleasure craft when knifing through a high sea. Crews wear padded helmets and clothing and, especially below deck, are tossed around plenty as the hull spanks over rough water. When you imagine the difficulties of handling ammunition under such conditions you have to take your hats off to the indestructible characters who man our PT squadrons.

Docking after an hour's gyrations, we picked the windblown hair out of our eyes and teeth, shook hands limply with Commander Williams and weaved with the rest of the party back into the Whittier where Packard had supplies of adrenalin and heated moose milk to revive the landlubbers.

"PT," we understand signifies "patrol torpedo," but in our lexicon it i now "plenty terrific."

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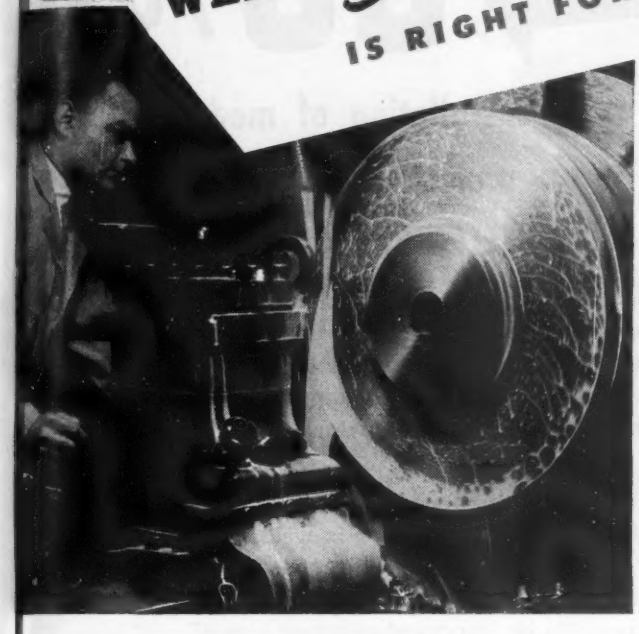
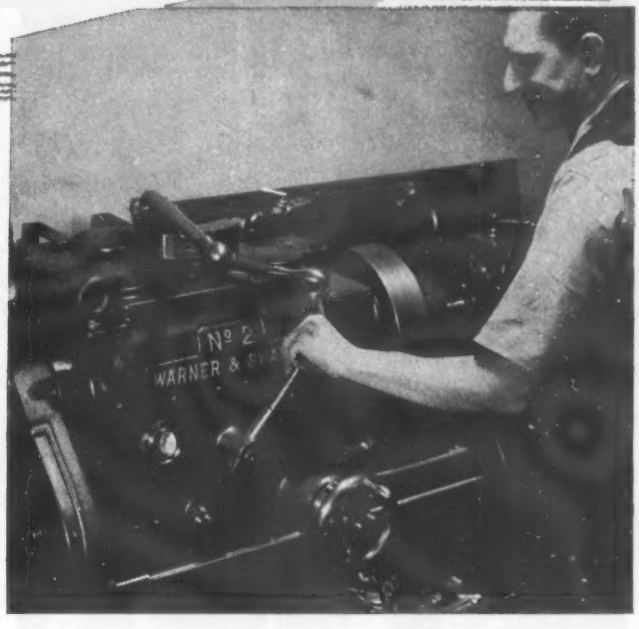
WHICH "Surplus" WARNER & SWASEY IS RIGHT FOR YOUR JOB?

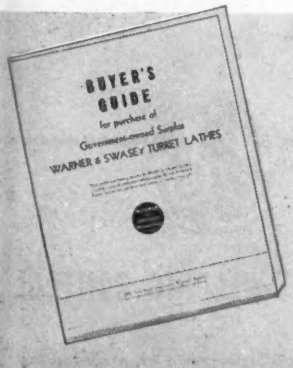




★Just as the same sized hat will not fit every man, the same model Warner & Swasey Turret Lathe and set of tools is not best adapted to every job. Over a period of years, our engineers have designed and perfected a whole series of models and tooling set-ups purposely to help you get the very utmost in production. And in a new machine sale, our field engineers make certain that every customer gets the one that's right for his job!

Today, however, many government-owned surplus Warner & Swasey Turret Lathes are available. If you are planning to invest in a surplus Warner & Swasey—which you must buy "as is", contact our nearest Branch Office. After obtaining the model and serial number, all you need to do is give us this information. We will send you the date of shipment of the turret lathe—the way it was equipped when it left the factory, and the types and sizes of work for which we believe it is best fitted.

Write to us here in Cleveland, or see our nearest Branch Office. We'll be glad to help you get the most out of any Warner & Swasey you buy!



SEND FOR FREE COPY

The "Buyers Guide" will prove a valuable aid in helping you determine the proper Warner & Swasey Turret Lathe to suit your needs in the purchase of surplus turret lathes. To get a copy, just write to us here in Cleveland or contact your nearest Warner & Swasey Branch Office.

You can Machine it Better, Faster, for Less... with a Warner & Swasey

WARNER & SWASEY
Machine Tools
Cleveland

TURRET LATHES, SADDLE AND RAM TYPES—CHUCKING AND BAR TOOLS—PRECISION TAPPING AND THREADING MACHINES

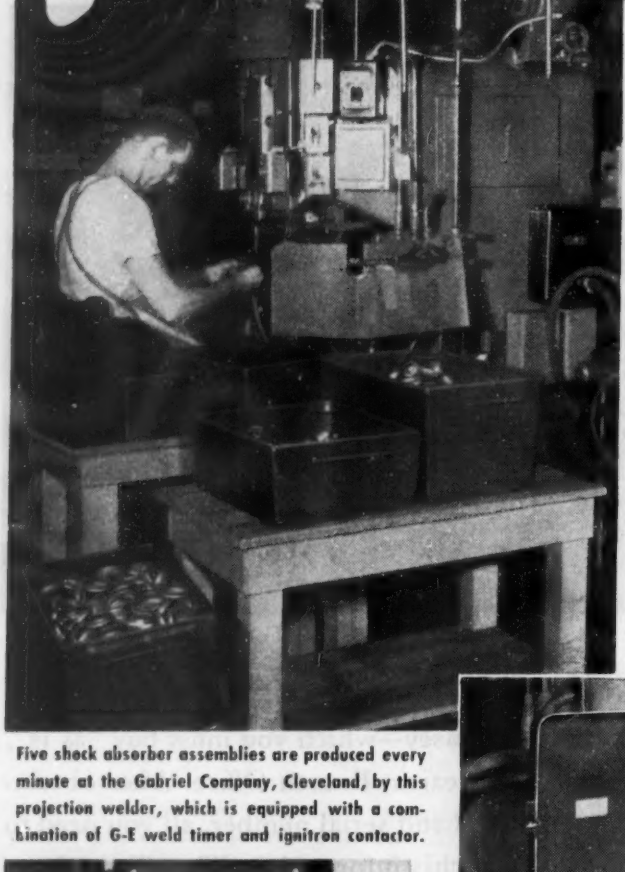
OUTPUT BOOSTED 33%

by installation of modern projection welders with ELECTRONIC CONTROL

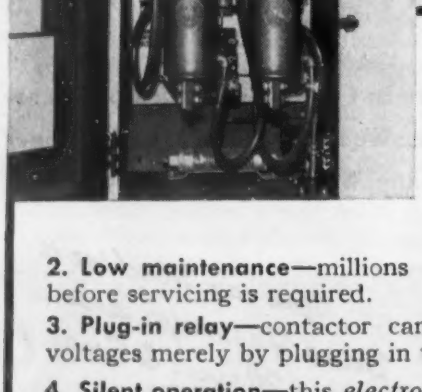
● Production of automobile shock absorbers by the Gabriel Company (Cleveland) has increased from 225 to 300 assemblies an hour. The new welders, which replace manually operated machines, are equipped with a G-E electronic weld timer and ignitron contactor.

With this new equipment, weld timing is much more accurate, according to I. J. Samuelson, plant manager. And there is far less variation in welds than before.

Also, wear and tear on dies has decreased, because less welding pressure is required. This reduction is made possible by improved pressure control.



Five shock absorber assemblies are produced every minute at the Gabriel Company, Cleveland, by this projection welder, which is equipped with a combination of G-E weld timer and ignitron contactor.



Four Important Advantages of the Ignitron Contactor

1. High-speed operation—because there are no moving parts, its speed of operation is limited only by the control-switch setting.

2. Low maintenance—millions of operations can be made before servicing is required.

3. Plug-in relay—contactor can be used on various control voltages merely by plugging in the correct relay.

4. Silent operation—this *electronic* switch is completely noiseless.

● Need More Information?

Our engineers will be glad to help you select exactly the right weld timer and ignitron contactor for your application. Simply get in touch with the nearest G-E office. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

Here's What the Electronic Weld Timer Offers YOU

1. Automatic timing of the duration of the weld current—operator errors in timing are eliminated.

2. Safe operation—a sturdy, deadfront construction gives operators maximum protection.

3. Easy inspection—because the control panel is hinged, it is easily accessible for inspection.

4. Quick adjustment—the dial is conveniently located on the control panel.

RESISTANCE-WELDING CONTROL

Keep on buying BONDS—and *keep all you buy*

GENERAL ELECTRIC

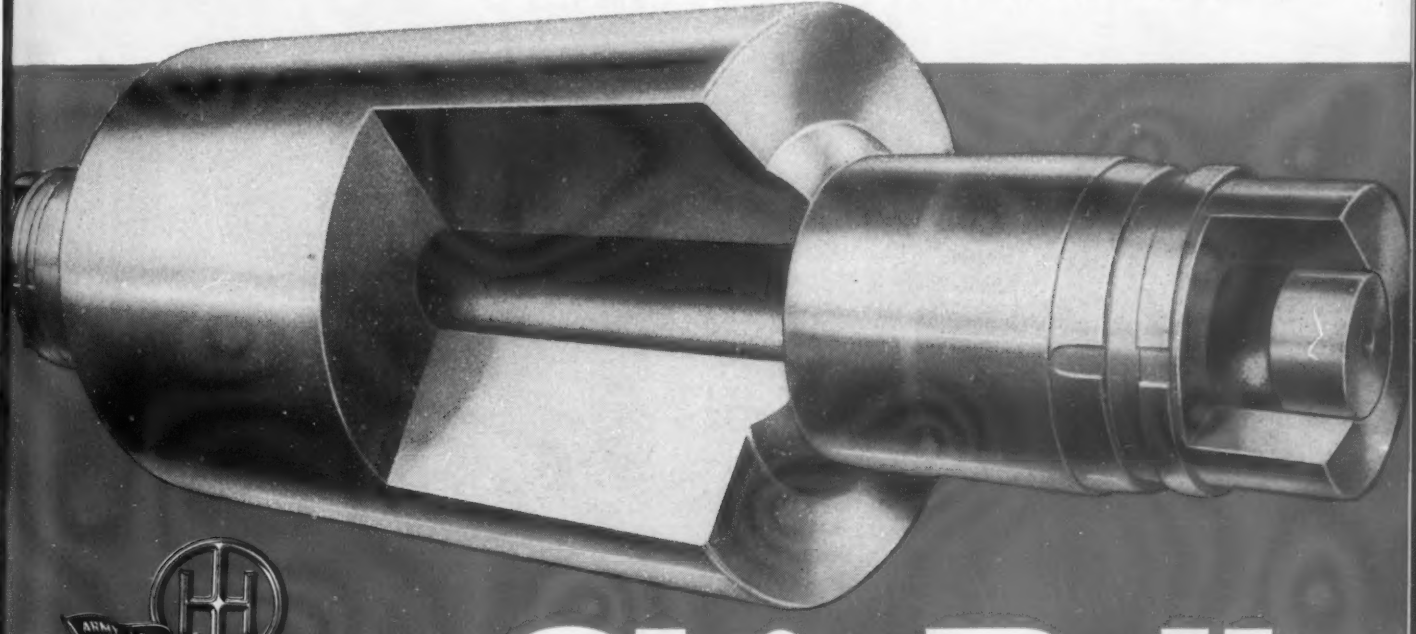
645-37-8960

"It's Steel!"

TO AMERICANS everywhere the words "It's Steel!" have meant—and will continue to mean—it's the best! Such confidence is not undeserved, for the strength, adaptability and reliability of steel are demonstrated daily in thousands of different ways.

Now the peacetime products of steel are moving off the assembly lines into an impatient market. Steel by the thousands of tons is finding its way into Dad's automobile, Mother's washing machine, Junior's scooter. The demand is great and more diversified than ever, but steelmakers were prepared.

Ohio Steel, too, is keeping the pace. More Ohio Rolls are being used in the steel mills of America than ever before. These rolls, made under rigid control from selection of materials to final inspection, are the finest ever to come out of our Lima, Ohio, plant.



ARMY E NAVY

...ect from any of these 9 types of Ohio Steel ...d Iron Rolls: Carbon Steel Rolls • Ohioloy ...s • Ohioloy "K" Rolls • HOLL-O-CAST Rolls ...ed Iron Rolls • Denso Iron Rolls • Nickel ...n Rolls • Hi-nickel Grain Rolls • Flintuff Rolls

Free Enterprise is the Only Way to Constantly Higher American Living Standards

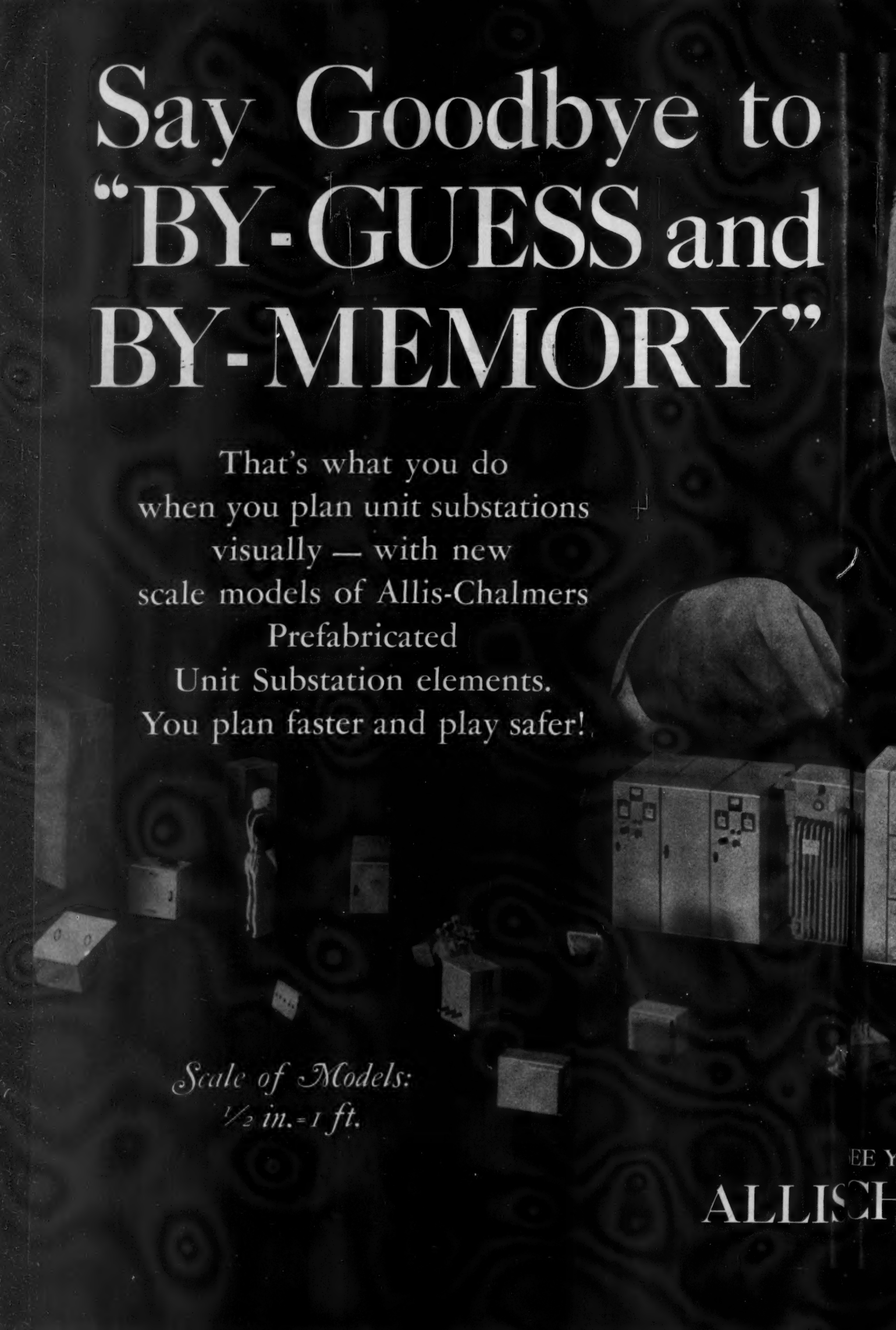
Ohio Rolls

THE OHIO STEEL FOUNDRY COMPANY

LIMA, OHIO • PLANTS: LIMA AND SPRINGFIELD, OHIO

Say Goodbye to "BY-GUESS and BY-MEMORY"

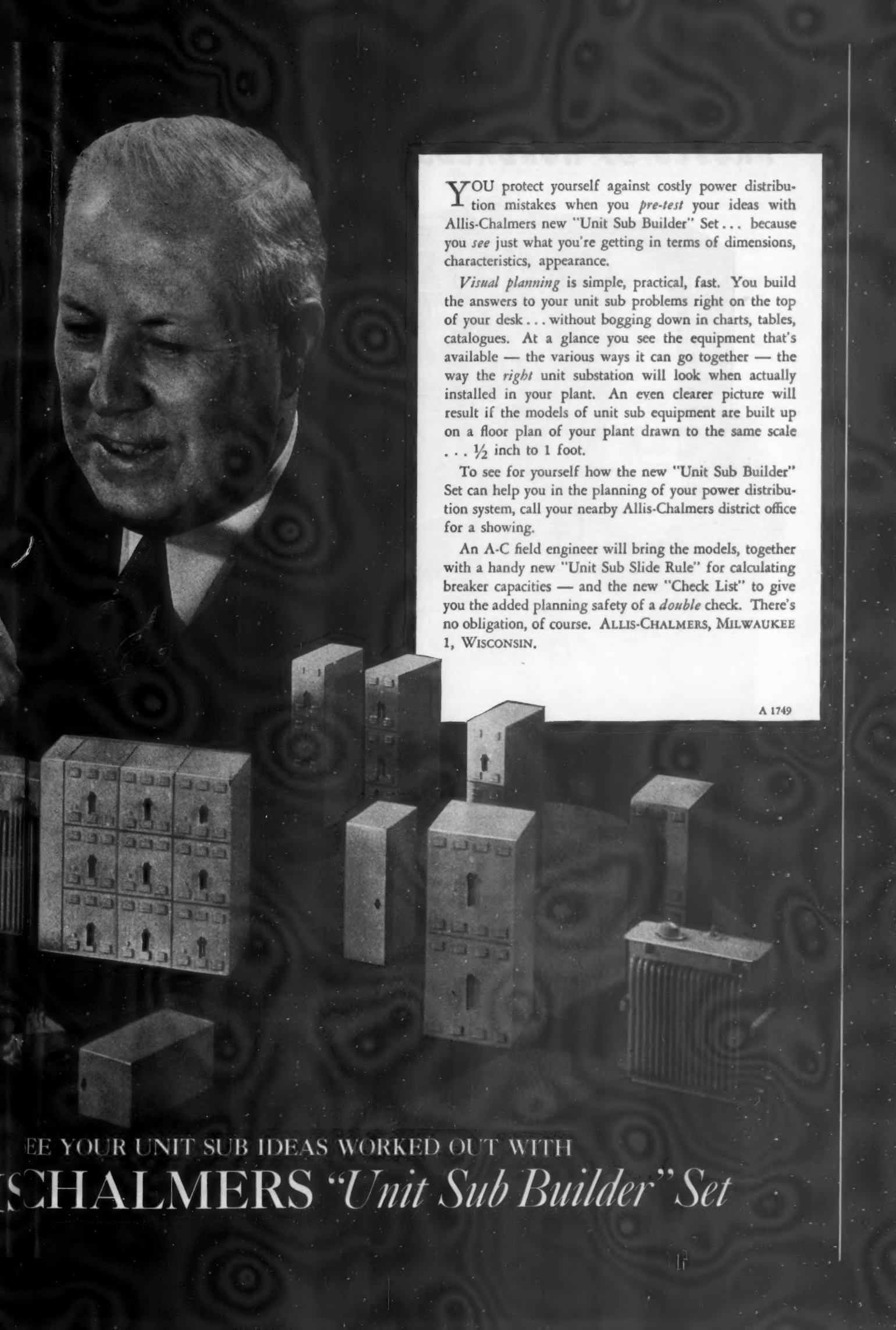
That's what you do
when you plan unit substations
visually — with new
scale models of Allis-Chalmers
Prefabricated
Unit Substation elements.
You plan faster and play safer!



Scale of Models:
1/2 in. = 1 ft.

EE Y

ALLIS



YOU protect yourself against costly power distribution mistakes when you *pre-test* your ideas with Allis-Chalmers new "Unit Sub Builder" Set . . . because you *see* just what you're getting in terms of dimensions, characteristics, appearance.

Visual planning is simple, practical, fast. You build the answers to your unit sub problems right on the top of your desk . . . without bogging down in charts, tables, catalogues. At a glance you see the equipment that's available — the various ways it can go together — the way the *right* unit substation will look when actually installed in your plant. An even clearer picture will result if the models of unit sub equipment are built up on a floor plan of your plant drawn to the same scale . . . ½ inch to 1 foot.

To see for yourself how the new "Unit Sub Builder" Set can help you in the planning of your power distribution system, call your nearby Allis-Chalmers district office for a showing.

An A-C field engineer will bring the models, together with a handy new "Unit Sub Slide Rule" for calculating breaker capacities — and the new "Check List" to give you the added planning safety of a *double* check. There's no obligation, of course. ALLIS-CHALMERS, MILWAUKEE 1, WISCONSIN.

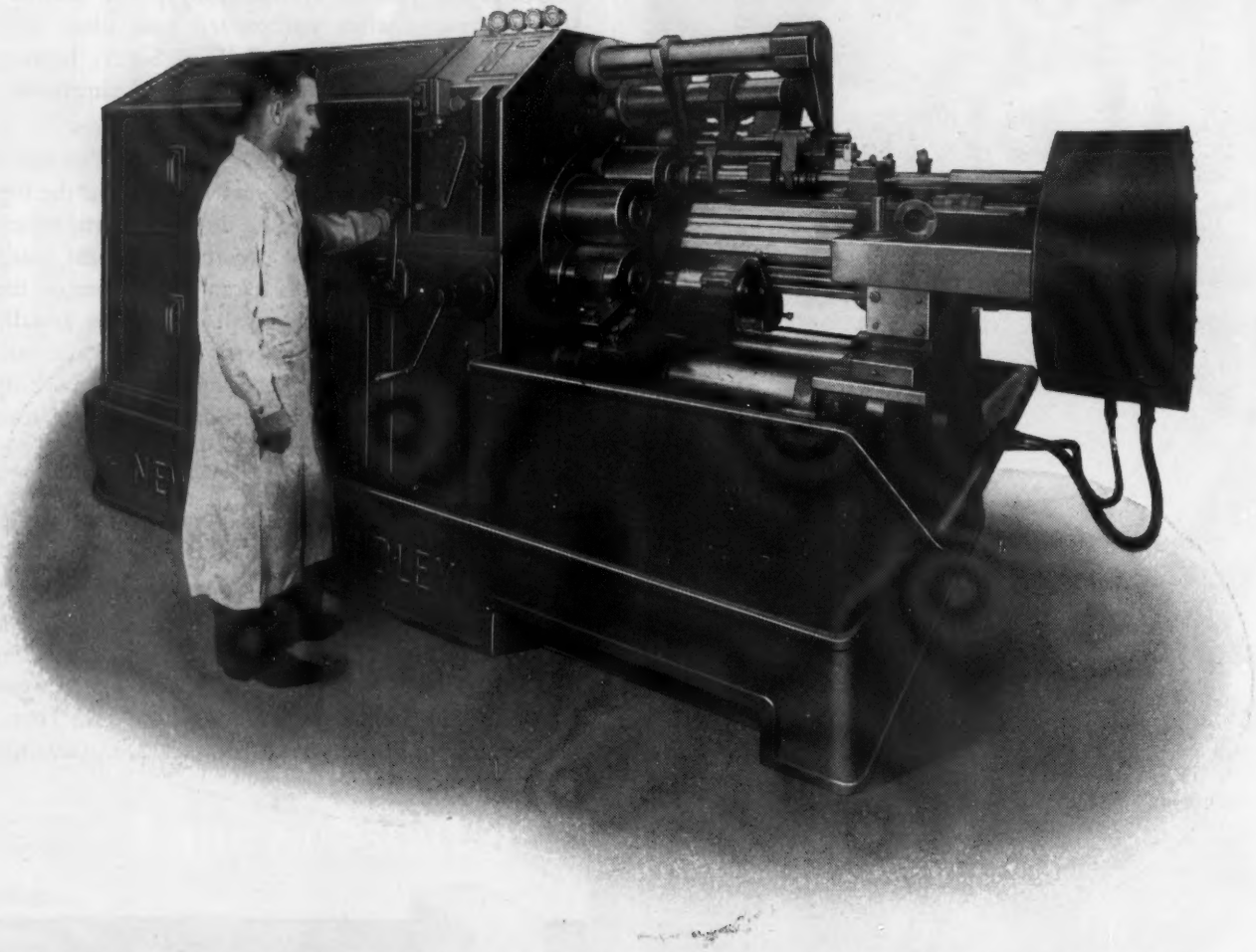
A 1749

EE YOUR UNIT SUB IDEAS WORKED OUT WITH

CHALMERS *"Unit Sub Builder" Set*

LEADERSHIP

PROVED BY HUNDREDS OF CASE HISTORIES... ..



PLANNED PRODUCTION BECOMES EASIER WITH NEW BRITAINS

The built-in accuracy of New Britain Automatics assists many a manufacturer to plan peacetime production... helping skilled workmen to meet scheduled production at lowered costs.

For thirty years New Britain has been engineering, designing and producing multiple spindle bar and chucking machines that were ahead of the industry's demands for greater accuracy, higher speed and easier operation. This advanced engineering approach has been responsible for the production achievements New Britains have compiled during two wars and the times of peace that followed.

Many case histories, such as the one featured here, demonstrate the versatility of New Britains at work... forecast their productive value in the years ahead.

Consult a New Britain sales engineer. Let him prove that New Britains produce more... better and faster ...and that they belong in your planned production.

Let us be on the alert to recognize this honorable discharge button of World War II. Its wearer has earned our deepest gratitude and is deserving of the best we have to give him.

NEW BRITAIN AUTOMATICS

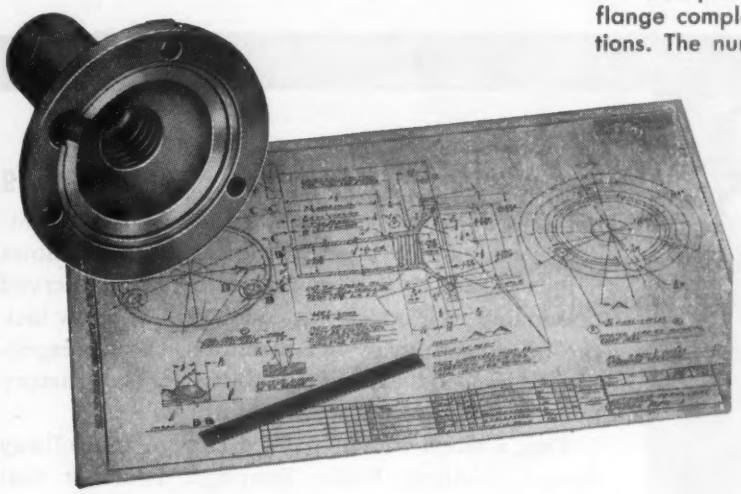
THE NEW BRITAIN MACHINE COMPANY
NEW BRITAIN, CONNECTICUT
NEW BRITAIN-GRIDLEY DIVISION

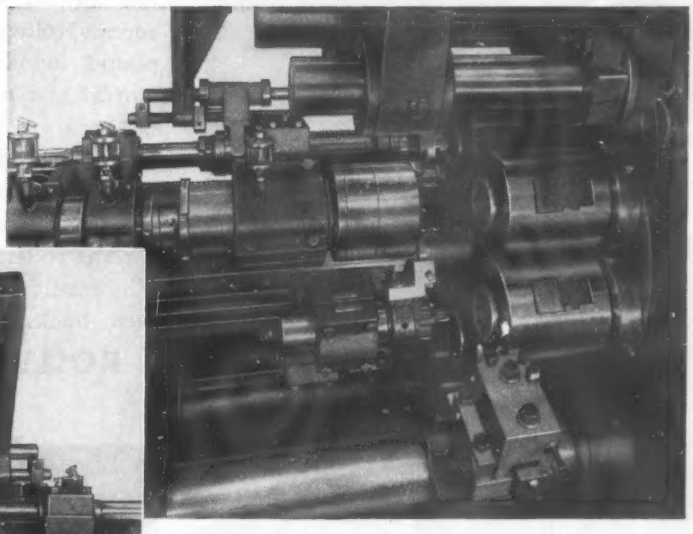
...HERE'S ANOTHER

A typical case history is the Main Drive Gear Bearing Retainer pictured here . . . The number of cuts required, the need for economy of operation and speed of production, with rejects held to a minimum, posed a problem which was solved by the selection of a New Britain Model 675, 6 Spindle Automatic Chucking Machine.

The first problem was to place tools so that this cast iron piece could be loaded and the bore and flange completely machined in the first four stations. The number five station carried a multiple drill head that machined the three holes in the flange at one time. The sixth station carried a collapsing tap for putting in oil grooves. This right hand spiral groove was 3/32" wide and 1/16" deep, and had to be held concentric with the bored and turned diameters within .002 total indicator reading, Sixteen operations in all, performed in 15 seconds, with gross production of 240 pieces per hour.

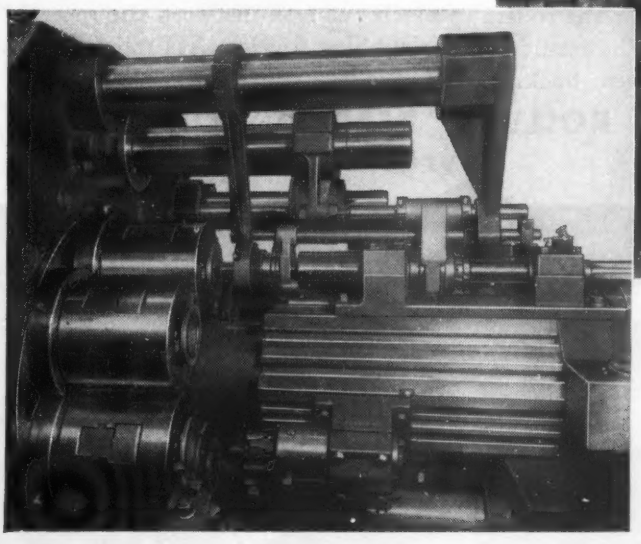
This is another case where the versatility and advanced engineering of New Britain Automatics solved a difficult problem.





FRONT VIEW

Entirely open end construction provides accessibility for simplified chucking, cutting tool and attachment set-up.



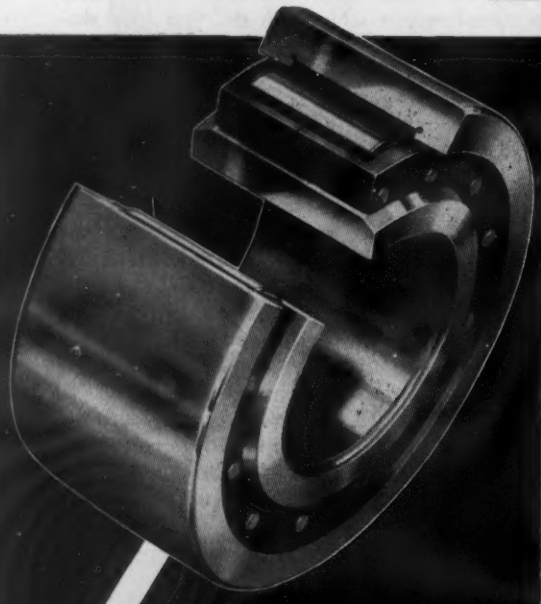
REAR VIEW

Wide open end construction provides extra large chip space . . . accessibility from three sides and from above that permits excellent visability and easy tool adjustment.

The New Britain machine line includes four, six and eight multiple spindle automatic bar machines up to 2¼" capacity. Also a wide range of four, six and eight multiple spindle automatic chucking machines up to 12" capacity.

BEARING CAPACITY

for tomorrow's heavier machine loads...



ROLLWAY RIGHT-ANGLE LOADING

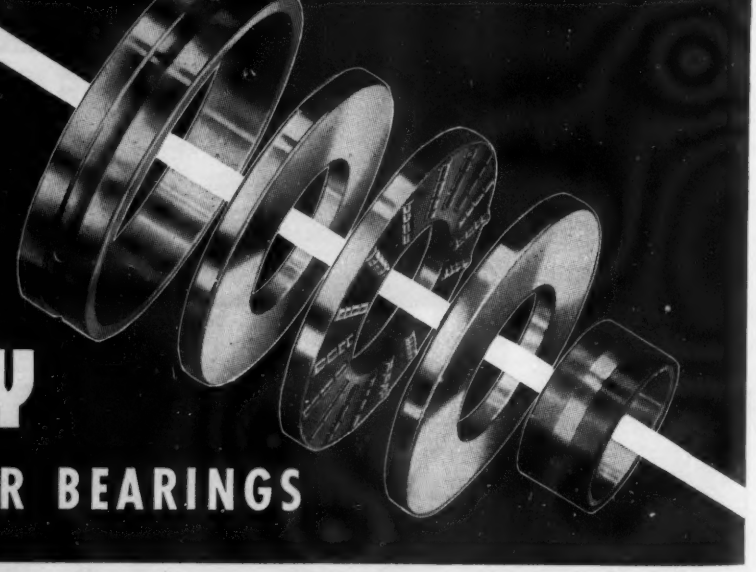
Change to Rollway Right Angle Loading

In the drive for postwar production . . . for competitive advantage in postwar markets . . . machines will be pushed to new limits. Bearings which served reasonably well under war conditions will now lack the freedom from service attention, the life expectancy, the load capacity required for satisfactory operations on new peacetime output.

That's when it will pay to change to Rollway Solid-Cylindrical Roller Bearings. Bearings that give you more metal to carry the load . . . longer line contact with the race . . . and lower unit pressures. Rollway Right-Angle Loading splits compound loads into the two components of *pure radial* and *pure thrust* . . . carries each of these on separate roller assemblies. Total load magnitudes per bearing are lower, and are carried perpendicular to the roller axis. There are no oblique resultants, no complicated stresses, no tendency for the rollers to pinch out from between the race. The result . . . less rubbing friction, less roller-end wear back.

ROLLWAY BEARING CO., INC.
Syracuse, N. Y.

Find out today how Rollway Right-Angle Loading can improve your bearing performance. Just send a print of your assembly with specification of load, speed and type of service for confidential analysis and recommendation. No charge. No obligation.



ROLLWAY
CYLINDRICAL ROLLER BEARINGS

SALES OFFICES: Philadelphia • Boston • Pittsburgh • Youngstown • Cleveland • Detroit • Chicago • St. Paul • Houston • Tulsa • Los Angeles

WHEN YOU

CALL SALEM

ABOUT HEATING FURNACES

STEP 4

HEATING ENGINEER OUTLINES PRELIMINARY PLANS

When you "*Call Salem*", a heating engineer discusses your requirements and passes along useful information based on years of diversified heating experience.

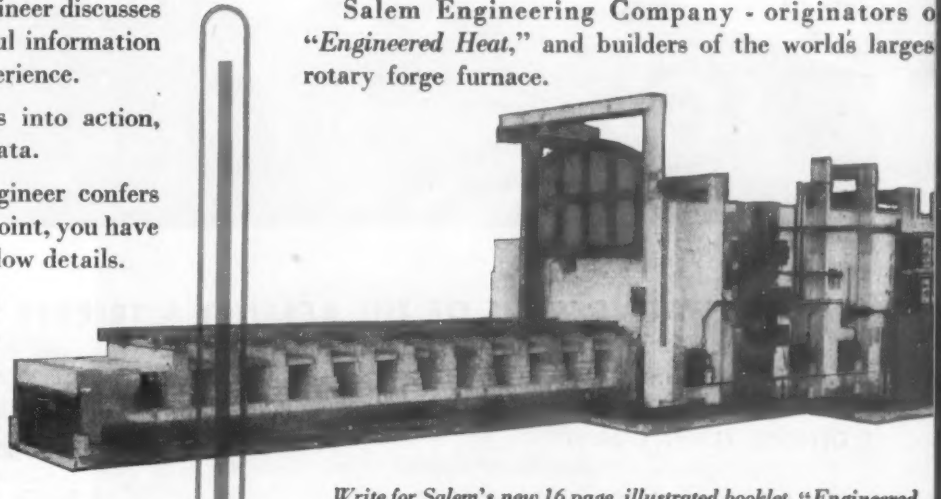
Then the Salem organization swings into action, preparing roughs and assembling test data.

When this material is ready, the engineer confers with you on the progress to date. At this point, you have the opportunity of checking production flow details.

When you have approved plans, a corps of draftsmen prepare working drawings and construction gets under way.

This close co-operation and planning between your organization and Salem's engineers give you the result you want--- *an efficient and economical heating equipment installation.*

Salem Engineering Company - originators o "*Engineered Heat,*" and builders of the worlds larges rotary forge furnace.



Write for Salem's new 16 page, illustrated booklet, "Engineered Heat," complete with easy-to-use heating and temperature charts and illustrations of the many sizes and types of heating furnaces made by Salem.

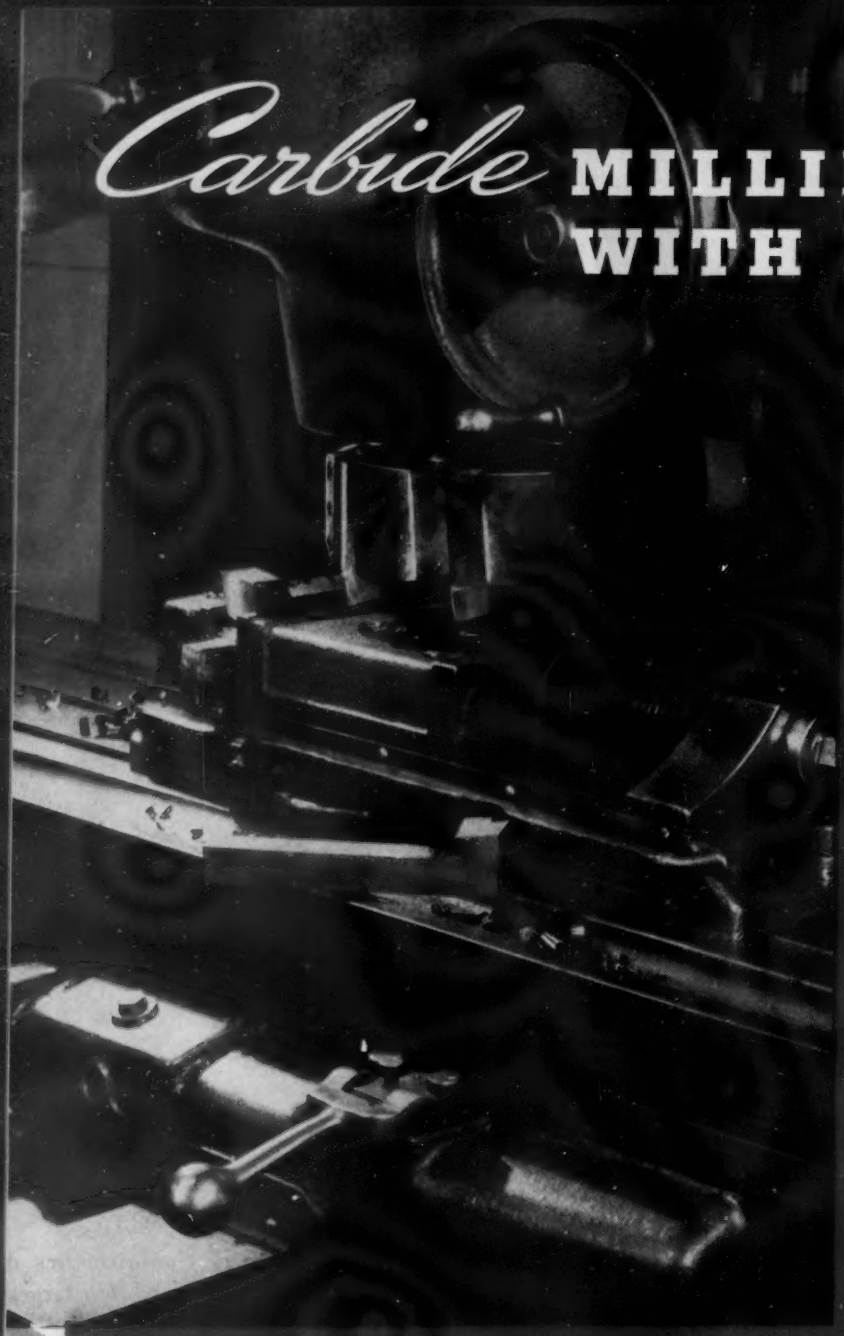
SALEM

ENGINEERING COMPANY

SALEM, OHIO

SALEM ENGINEERING COMPANY

Engineered Heat



Carbide MILLING OF STEEL . . . WITH EXCEPTIONAL E

READ THIS PERFORMANCE REPORT:

The illustration shows an interesting high-speed milling operation performed on a vertical model CSM milling machine at the Wendt-Sonis Company, Hannibal, Missouri.

The work-piece is S.A.E. 1095 steel, hardness 18 Rockwell C. 4½ cubic inches of metal are removed in only two passes; the first cut is 7/16 inch deep, the second 5/16 inches deep. The finish on the cut metal is unusually good. An 8 inch 6 blade Wendt-Sonis face milling cutter is used for the operation, running at 342 rpm (682 sfm) with a table feed rate of 17½ inches per minute.

Concerning the performance of the CSM milling machine, Mr. Del Rhino, Wendt-Sonis Plant Superintendent, enthusiastically says "We have increased our production eight to ten times over our previous method of milling this workpiece. We have experienced similar increase in the production rate on other jobs we have milled with this machine. We are not alone pleased with the performance of the CSM machine but also with its ease of operation."

REPRESENTATIVE USERS OF THE KEARNEY & TRECKER 50hp CSM MILLING MACHINE

GLENN L. MARTIN COMPANY - - Middle River, Baltimore County, Maryland

DEFENSE PLANT CORP. - - - Fisher Body Division, Flint, Michigan

IRON FIREMAN MFG. COMPANY - - 4784 S. E. 17th Avenue, Portland, Ore.

WENDT-SONIS COMPANY - - Hannibal, Missouri

GENERAL AIRCRAFT EQUIPMENT COMPANY - - - - - - - South Norwalk, Conn.

KENNAMETAL, INCORPORATED - - Latrobe, Penn.

CHANCE VOUGHT AIRCRAFT, - Div. of United Aircraft Corp., Stratford, Con

MATTISON MACHINE WORKS - - Rockford, Illino

A. O. SMITH CORPORATION - Milwaukee, Wisconsi

CATERPILLAR TRACTOR COMPANY - Peoria, Illino

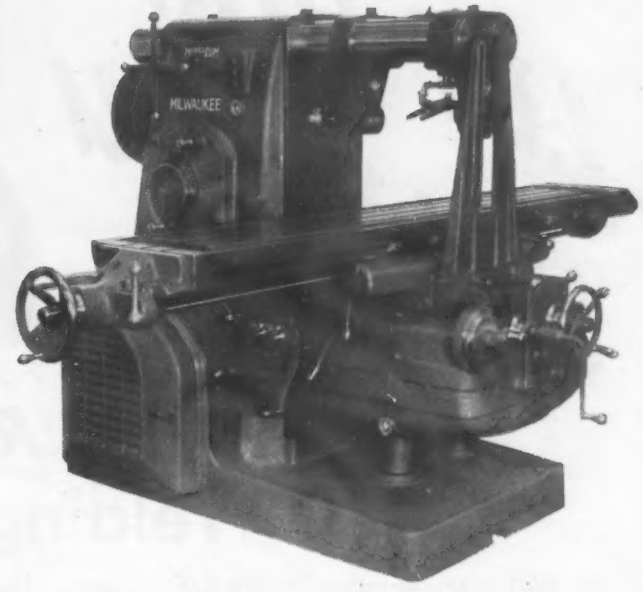
INGERSOLL MILLING MACHINE COMPANY - - - - - - - - - - Rockford, Illino

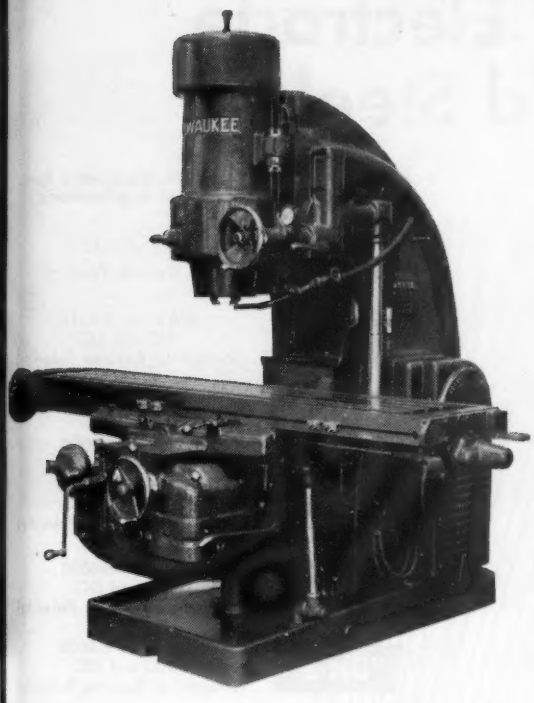
LANDELIUS & BJOERKLUND - - Stockholm, Swede

KEARNEY & TRECKER CORPORATION MI

. . . AT *HIGH SPEED* . . .
EASE OF OPERATION

THE KEARNEY & TRECKER 50 hp CSM MILLING MACHINE





The 50 hp CSM is an all purpose milling machine, specially engineered and built to meet the demands of Carbide Steel Milling—a comparatively recent development in high speed milling. It is a rugged, massive machine having great rigidity and equipped with ample power for the increased rate of metal removal made possible through the application of carbide cutters.

A heavy flywheel, mounted on the spindle, assists in providing and maintaining a uniform flow of power to the spindle. Direct power to the gear trains in the saddle and knee is supplied by a 5 hp motor mounted on the side of the knee. Speed changes and cutter positioning are facilitated by means of a conveniently accessible electric inching button. An electric spindle brake provides for almost instant stopping of the spindle.

Designed and constructed expressly to meet modern demands for increased high-speed production the CSM milling machine will not only handle carbide steel milling operations with ease and speed but also regular and heavy milling jobs to perfection.

If you are responsible for milling operations in your plant we would be glad to place your name on our mailing list to receive current data on metal cutting, as issued from time to time. Write on your business letterhead for "Metal Cutting Research Data."

MILWAUKEE 14, WISCONSIN

LET HIM HELP YOU

Choose the *Right* Electrode for Welding Mild Steels

The P&H representative knows arc welding. He's a specialist who lives with welding problems . . . who knows how to help you save time, save money and insure the best welding results through the proper selection of electrodes for every type of job.

Today, a staggering amount of time and money is wasted through misapplications. Don't let it happen in your shop. Whatever your mild steel welding work may be, you'll find the correct sizes and types of electrodes in the P&H line to answer every need. The quick and easy way to be sure, on this or any other welding problem, is to call in your nearest P&H representative. He brings you the experience of one of the world's largest *makers* and *users* of all types of welding electrodes. He is ready to help you without cost or obligation. Ask him to call.

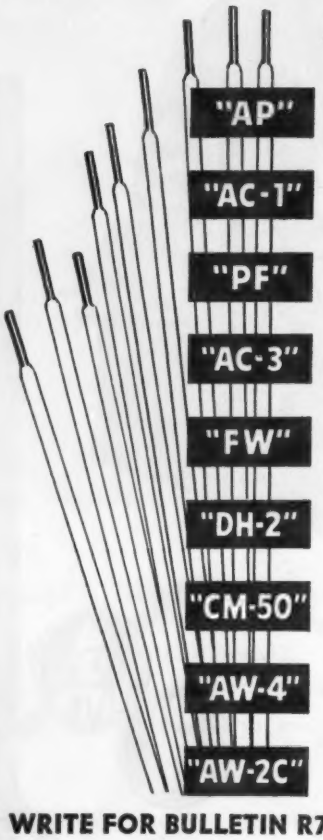
P&H

WELDING ELECTRODES

4411 W. National Avenue
Milwaukee 14, Wisconsin

HARNISCHFEGER CORPORATION

WELDING ELECTRODES • MOTORS • HOISTS P&H ELECTRIC CRANES • ARC WELDERS • EXCAVATORS



A Few P&H Electrodes For Mild Steel Applications

AWS — E-6010
(DC Reverse Polarity)

AWS — E-6011
AC and DC
(Straight or Reverse Polarity)

AWS — E-6012
AC and DC
(Straight Polarity)

AWS — E-6013
AC and DC
(Straight or Reverse Polarity)

AWS — E-6020
AC and DC
(Straight or Reverse Polarity)

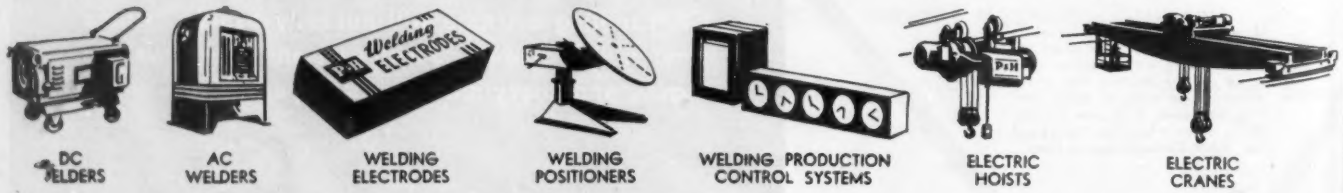
AWS — E-6020
AC and DC
(Straight or Reverse Polarity)

AWS — E-7011
AC and DC
(Straight or Reverse Polarity)

AWS — E-10012
AC and DC
(Straight or Reverse Polarity)

AWS — E-10020
AC and DC
(Straight or Reverse Polarity)

A COMPLETE ARC WELDING SERVICE • WRITE FOR BULLETIN R7-3



DC WELDERS | AC WELDERS | WELDING ELECTRODES | WELDING POSITIONERS | WELDING PRODUCTION CONTROL SYSTEMS | ELECTRIC HOISTS | ELECTRIC CRANES

The modern facilities developed for the production of N-A-X Armorplate are now meeting peacetime requirements

Designed and installed for the production of N-A-X Armorplate, this special heat-treating unit gives Great Lakes Steel Corporation facilities for supplying you with alloy sheets and plates fully heat-treated (quenched and drawn) to a wide range of high physical properties, constantly uniform in hardness and flatness. Pre-heat-treated N-A-X alloy sheets and plates can be supplied in thicknesses of ⅛″ to 1″; in widths of 6″ to 72″; and in lengths up to 336″. For complete information, write:

GREAT STEELS FROM GREAT LAKES

GREAT LAKES STEEL
Corporation

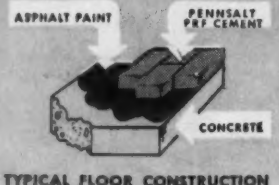
N-A-X ALLOY DIVISION • DETROIT 18, MICHIGAN
UNIT OF NATIONAL STEEL CORPORATION

A NEW AND SUPERIOR RESIN-TYPE CEMENT...

PENNSALT PRF CEMENT

Designed specifically for bonding corrosion-proof brick and tile in uses where acids, alkalis and solvents are encountered

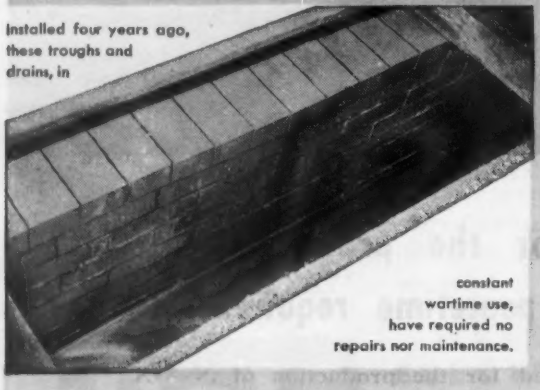
Typical applications are laying floors and drains, and lining tanks in metal finishing shops where a special cement is required that will resist corrosive acids, alkalis and solvents.



TYPICAL FLOOR CONSTRUCTION

DRAIN OR TANK LINING

PROTECTION FOR SUPPORTS


Installed four years ago, these troughs and drains, in constant wartime use, have required no repairs nor maintenance.

PROPERTIES

Chemical Resistance — Inert to: Alkalis, fats, oils, solvents, fresh or salt water, steam, all mineral acids including hydrofluoric acid, with exception of high concentrations of strong oxidizing acids such as nitric, chromic and many organic acids, and alternate contact with strong acid and alkali.

Attacked by strong oxidizing agents.

Color	Black
Permissible temp. in use	Up to 375° F.
Absorption (ASTM)	Less than 0.5%
Compressive strength	12,000-14,000 lbs. per sq. in.
Tensile strength	1,000-2,000 lbs. per sq. in.
Modulus of rupture	1,800-2,100 lbs. sq. in.
Coefficient of thermal expansion	.0000087 inches/inch/degree F. (In range 80-350° F.)
Porosity	Completely impermeable, even at elevated temperatures. It is non-porous.
Joint thickness recommended	⅛-¼ inch
Mortar required to butter one 9 inch brick on 3 sides	½ lb. (approximately)
Storage	Can be stored indefinitely in a cool place.
Hardening time	Pennsalt PRF Cement construction may be placed in service within twenty-four hours.

Containers (Non-returnable)	POWDER	SOLUTION
	20 lb. drum	10 lb. drum
	100 " "	50 " "
	250 " "	375 " "

SPECIAL CHEMICALS DIVISION PRODUCTS

Acid, Alkali, and Solvent proof cements—Acid, Alkali, and Solvent Emulsion Type Cleaners—Paint Strippers—Pickling Agents—Rust Inhibitor.

SPECIAL CHEMICALS DIVISION
PENNSYLVANIA SALT MANUFACTURING COMPANY
Dept. S-11, 1000 Widener Building, Philadelphia 7, Pa.

I would like to have you send me free booklet on Pennsalt PRF Cement.

NAME _____

TITLE _____

COMPANY _____

ADDRESS _____

Special Chemicals Division

PENNSYLVANIA SALT MANUFACTURING COMPANY

Chemicals

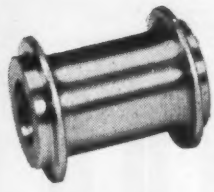
1000 Widener Building, Philadelphia 7, Pa.

NEW YORK • CHICAGO • ST. LOUIS • PITTSBURGH • CINCINNATI • MINNEAPOLIS • WYANDOTTE • TACOMA

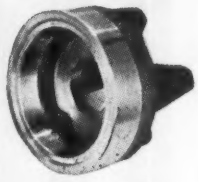
How to Cut the *COST* of *PARTS*

Here are just a few examples of the important cost-cutting jobs done in the production of precision parts by Acme-Gridley 4, 6 and 8-spindle Bar and Chucking Automatics.

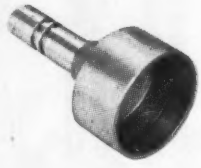
If you have parts to produce and want precision work at costs that help you meet your competition, write us about it.



- 2¼" steel hub—15 operations—machine time 28 seconds—Bar Automatic.



- Differential Housing—18 Chucker operations—cost 70% under previous method.



- Cast Iron Distributor Housing——42 operations on 2 Chuckers—costs far below previous record.

- A 200,000 quantity production job from bar stock—machine time 6 seconds.

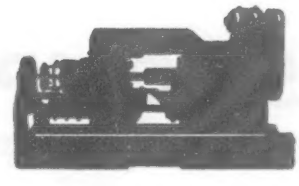
- 10½" Cast Iron Motor Bracket—14 Chucker operations—machine time under one minute.

- Cast Iron Motor Piston—15 tools first operation—14 tools second operation, on Chucker.

- Steel Bearing Race—turned from seamless tubing on bar automatic—machine time cut 90%.

- Valve Stem—a high precision stainless steel job for bar automatic—machine time 18 seconds.

ACME-GRIDLEY BAR and CHUCKING AUTOMATICS

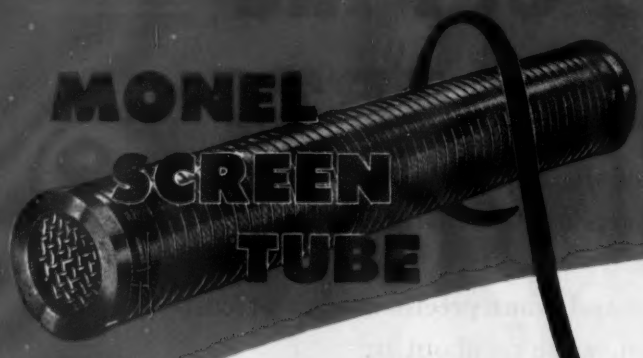


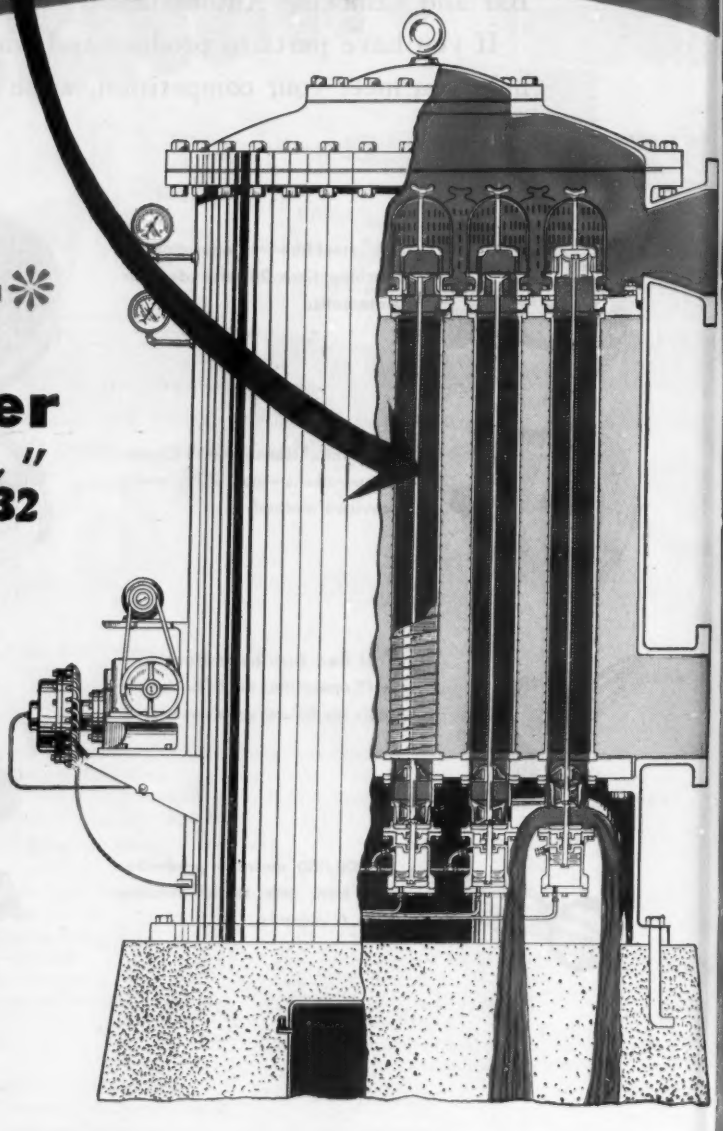
Maintain accuracy at the highest spindle speeds and fastest feeds modern cutting tools can withstand.

THE NATIONAL ACME COMPANY

170 EAST 131st STREET · CLEVELAND 8, OHIO

ADAMS AUTOMATIC WATER FILTERS





Remove GRIT and DIRT* from River Water

*15 times finer than 1/32"

Adams *Poro-Screen* Filters offer a practical answer to large-scale filtration of dirty river water for use in hydraulic equipment. Designed for continuous, automatic operation and requiring a minimum of attention, Adams Automatic Filters supply the required volume of clean water for your operations—water free of dirt and grit which damage bearings, rolls, valves and other equipment. Highly successful on water cooling installations of open-hearth and heat-treating furnaces.

Adams Automatic Filters provide low velocity filtration. Their multiple tube design has no moving clearances, is fully automatic. One tube is back washed at a time while filter is delivering full rated capacity. Adjustable control gives flexibility of back-washing—excessively dirty water more frequently, normal water less frequently. Built in four sizes from 300 gpm. to 2000 gpm. Write for Bulletin 901.

★ R. P. ADAMS COMPANY, INC. ★

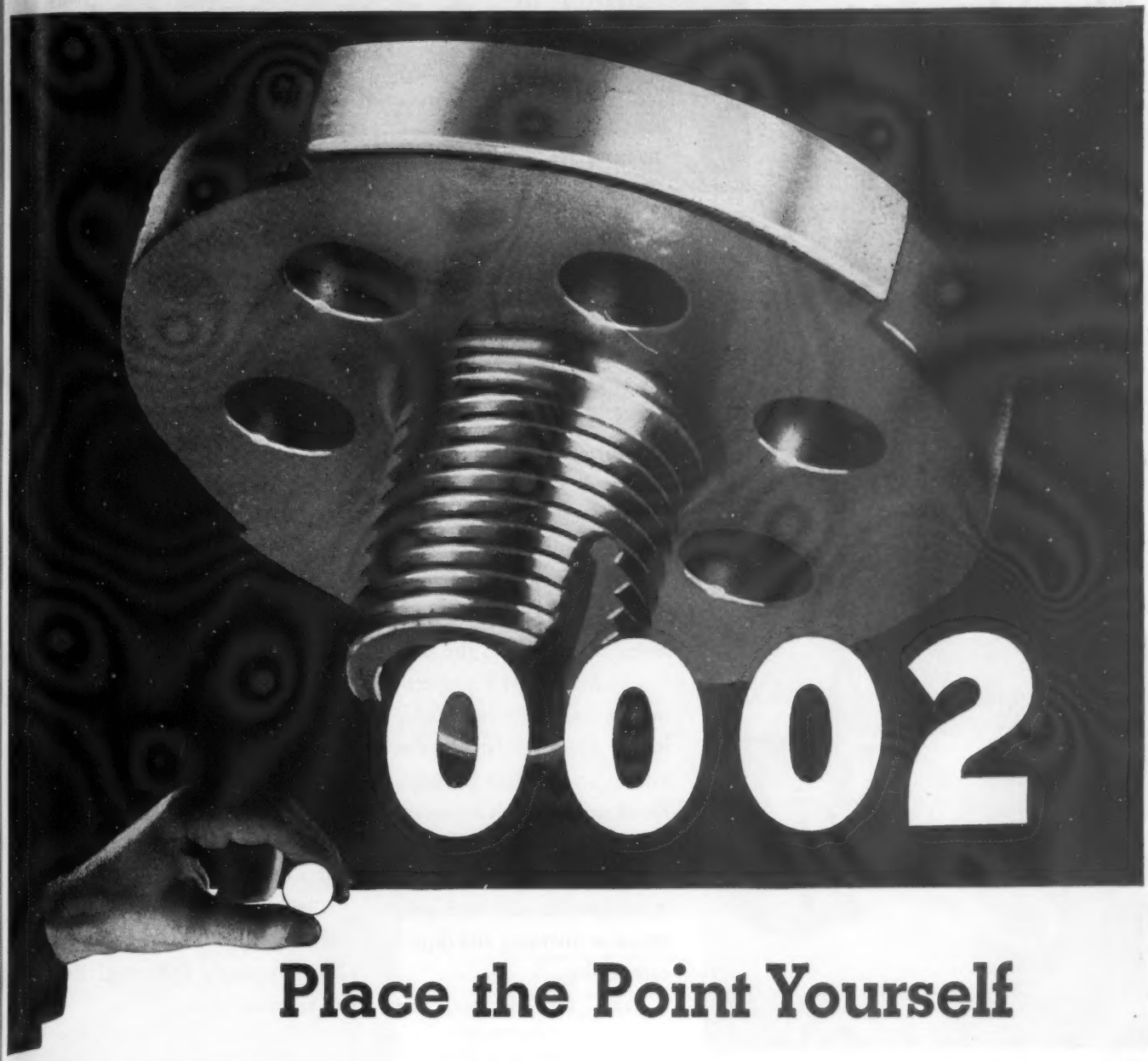
75 CHICAGO STREET, BUFFALO, N. Y.

ADAMS PORO-STONE AND PORO SCREEN FILTERS

SPECIAL COLD FORGED PARTS • STANDARD CAP SCREWS • HARDENED AND PRECISION GROUND PARTS • SHEET METAL DIES FROM THE LARGEST TO THE SMALLEST • JIGS • FIXTURES • STEAM-HEATED PLASTIC MOLDS • SPECIAL PRODUCTION TOOLS • R-B INTERCHANGEABLE PUNCHES AND DIES • DIE MAKERS' SUPPLIES

PRECISION • EXPERIENCE • DEPENDABILITY

ALLIED CORPORATION PRODUCTS



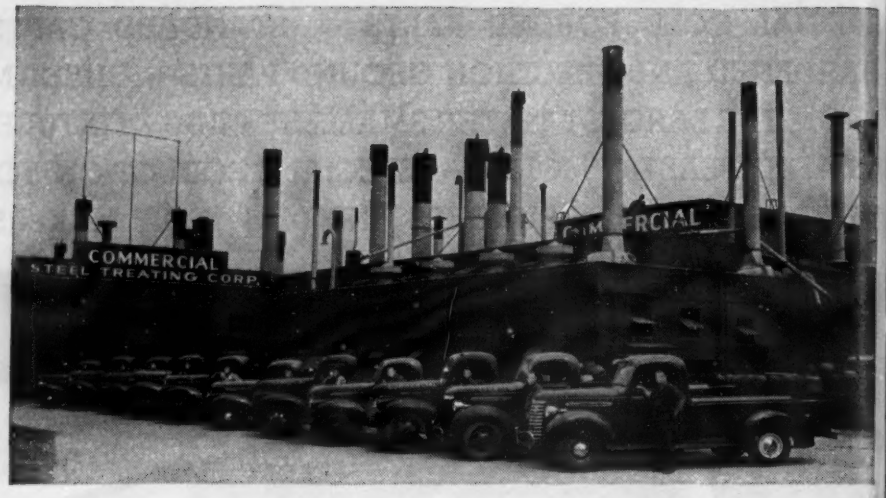
Place the Point Yourself

Whether your need is for hardened and precision ground parts to tolerances of two-tenths of an inch or two ten-thousandths of an inch, insist on an Allied product. During peace and war Allied's hardened and precision ground parts in *production quantities* have been a standard of quality in mass production industries. Today Allied's four superbly-equipped plants offer greater service than ever to manufacturers in the radio, home appliance, plastics, aviation, furniture, electrical, farm implement and other mass production fields. And mature business experience, economical production and deliveries *on time* make Allied service part of the firm foundation that manufacturing enterprises must have to bid for and hold quality markets. Write Allied today. This will entail no obligation. Allied engineers are always at your service.

ALLIED PRODUCTS CORPORATION

Department 30
4628 Lawton Avenue
Detroit 8, Michigan

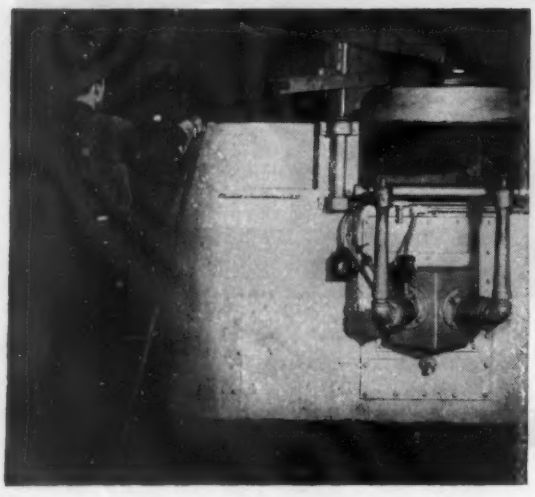
Pioneer in heat treating for thirty years



USES 47 GAS FURNACES

for wide variety of metals conditioning

Since 1916 the Commercial Steel Treating Corporation of Detroit has served a wide variety of manufacturers with many types of heat treating service. Today, 1500 customers of the company secure results of the highest quality through 47 Gas furnaces.



Operating 24 hours a day, seven days a week, the firm can look back on a pioneering era that saw it introduce, in the Detroit district, the atmosphere furnace for high speed steel, broach furnaces, underfired car bottom furnaces, recirculating type draw furnaces and such processes as nitriding and liquid carburizing.

Take, for instance, the Company's convection-heated Gas ovens where temperatures range from 275°F to 1250°F for aging aluminum, and annealing, blueing, tempering, drawing back and stress relieving of steel parts. Here, greater speed in production is possible because of Gas, while cost of operation is much lower than with competitive fuels.

This independent Gas heat treating establishment must pay off in complete customer satisfaction and show operating profits. Whether your heat treating is done on your own production line or at an outside plant, it will pay you to make sure you are getting the best in quality, speed and economy through Gas. Your local Gas Company's Industrial Engineer can tell you how.

Detroit firm satisfies 1500 exacting customers with high quality at reasonable costs

AMERICAN GAS ASSOCIATION
420 LEXINGTON AVENUE, NEW YORK 17, N.Y.

THE TREND IS TO GAS
FOR ALL INDUSTRIAL HEATING

DIAMOND G Stampings

Years of extensive engineering experience—modern facilities, precision equipment, and an organization of skilled designers and fabrication experts—enable George K. Garrett Company to offer a remarkably complete service in metal stampings for every industrial purpose.

Our completely equipped stamping department, together with heat-treating and finishing departments, will turn out — to your exact specifications—any quantities of stampings from steel, aluminum, alclad, brass, monel metal, stainless steel, copper and other metals. Prompt deliveries on large or small orders are assured.

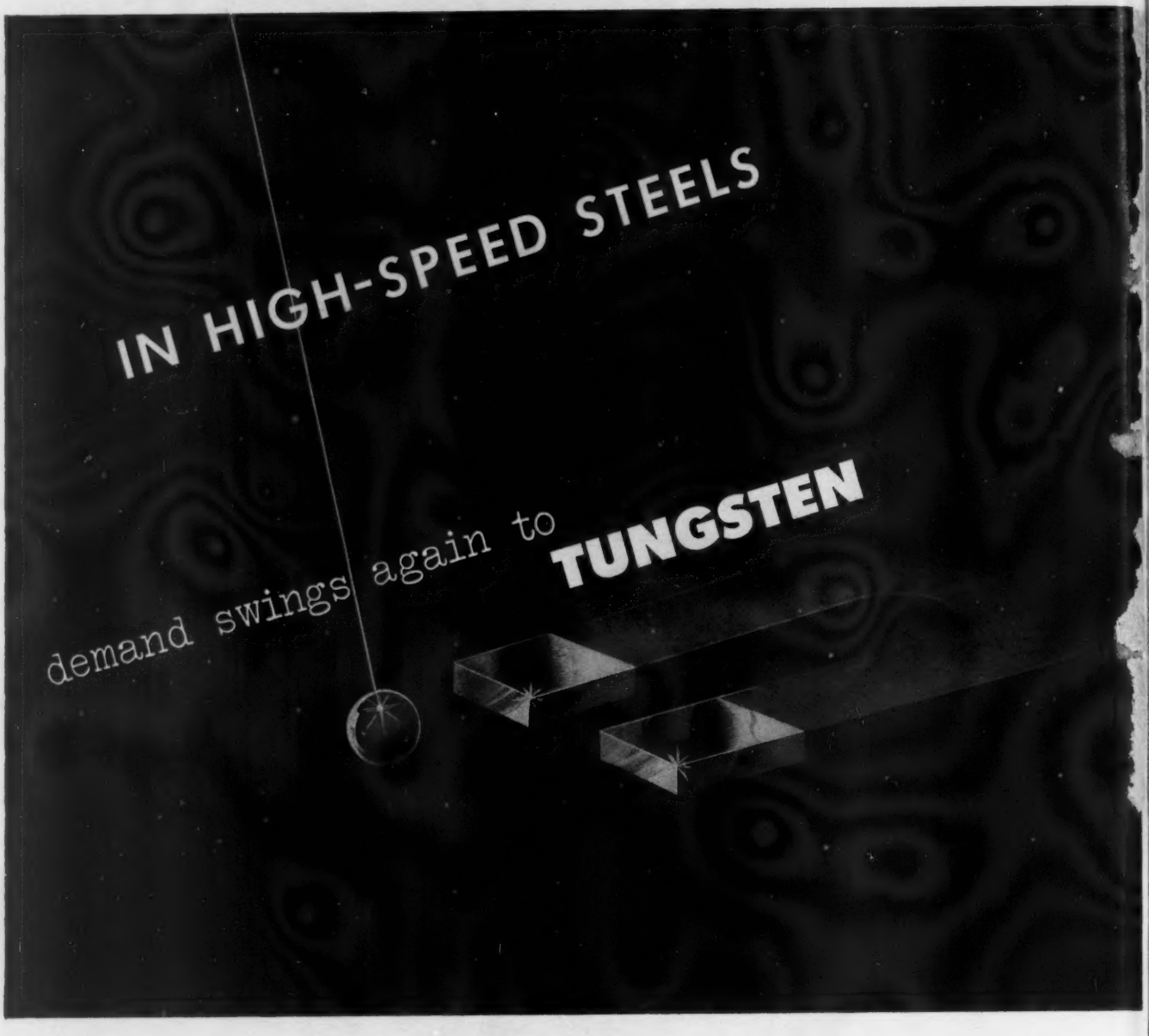
Your particular problem or requirements will receive our immediate attention!

GEORGE K. GARRETT CO., INC.

1421 CHESTNUT STREET, PHILADELPHIA 2, PA.

ARMY E NAVY

DIAMOND G PRODUCTS



Now that Tungsten high-speed steel can be supplied as needed, manufacturers are returning to it for the well-defined uses in which it surpasses all other materials.

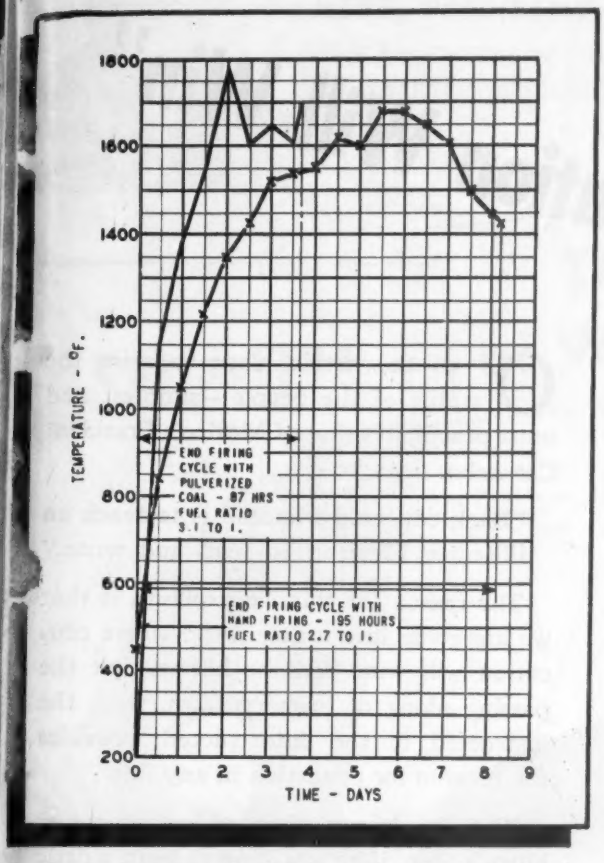
Very rapidly, since Government restrictions began to abate, the volume of Tungsten going for civilian requirements has increased month by month. An informative book, entitled "Tungsten Steels," has been prepared by the Molybdenum Corporation. It deals with both scientific and practical considerations, and recommends procedures that have been found to yield best results. A copy of this publication will be mailed on request. Correspondence is invited concerning any application of Molybdenum, Tungsten, or Boron.

AMERICAN Production, American Distribution, American Control—Completely Integrated.
Offices: Pittsburgh, New York, Chicago, Detroit, Los Angeles, San Francisco, Seattle.
Sales Representatives: Edgar L. Fink, Detroit; H. C. Donaldson & Co., Los Angeles, San Francisco, Seattle.
Works: Washington, Pa.; York, Pa.
Mines: Questa, N. M.; Yucca, Ariz.; Urad, Colo.

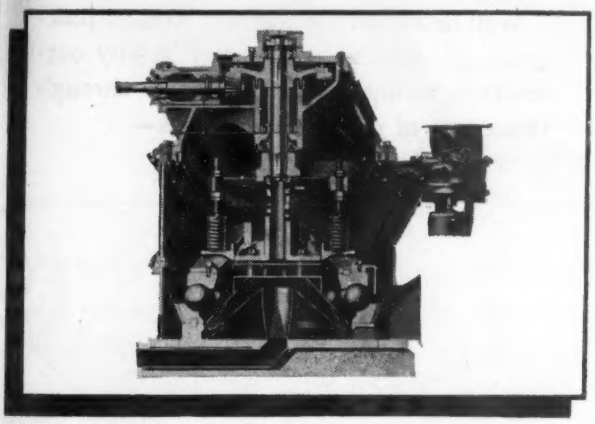
MOLYBDENUM CORPORATION OF AMERICA
GRANT BUILDING PITTSBURGH, PA.

MCA

56% Faster Annealing with Less Coal



Time-temperature curves showing time saving of pulverized-coal firing over hand-firing 30-ton malleable-iron annealing furnace.



B&W Type B Pulverizer as arranged for supplying coal to circulating systems for firing metallurgical furnaces.

By changing from hand-firing to direct pulverized-coal firing with the B&W Circulating System, firing time on five malleable iron annealing furnaces was reduced 56 per cent. Furnace output, in tons of castings annealed per ton of coal, jumped from 2.7 to 3.1.

ONE pulverizer serves all five furnaces through a single pulverized-coal circulating line that is looped overhead, out of the way. This simple arrangement of the B&W system eliminates multiple piping and coal-handling equipment necessary for direct firing individual furnaces, keeps floor space around the furnaces clear for product handling, and effects substantial economies in installation maintenance.

Flexibility in multi-furnace operation is obtained by providing as many take-offs to burners as required, and because burners may be turned on or off as desired. Furnace temperatures are controlled easily, by methods similar to those used with gas and oil firing.

Results from this installation have been so satisfactory, from both operating and economy standpoints, that a second B&W system of the same type has been planned to fire six other annealing furnaces in the same plant.

For detailed data on this simplified system of pulverized-coal firing for metallurgical furnaces, write for Bulletin 3-365.

B&W

Water-Tube Boilers, for Stationary Power Plants, for Marine Service . . . Water-Cooled Furnaces . . . Superheaters . . . Economizers . . . Air Heaters . . . Pulverized-Coal Equipment . . . Chain-Grate Stokers . . . Oil, Gas and Multifuel Burners . . . Seamless and Welded Tubes and Pipe . . . Refractories . . . Process Equipment.

then he said to himself:

"Education Will Win"

OF all the heroic plans to raise the status of the people—simplest and most practical is that of Mexico's President Camacho. Says he—

"Each educated Mexican is to teach an illiterate Mexican to read and write."

The reason for this, he explains, is that we are going into a new world where education will win. Well he knows that the passing along of primary facts, from the instructed to the uninstructed, provides the toehold for education in any line.

Well he knows that education never hurts a man, if he is willing to learn a little something after he graduates.

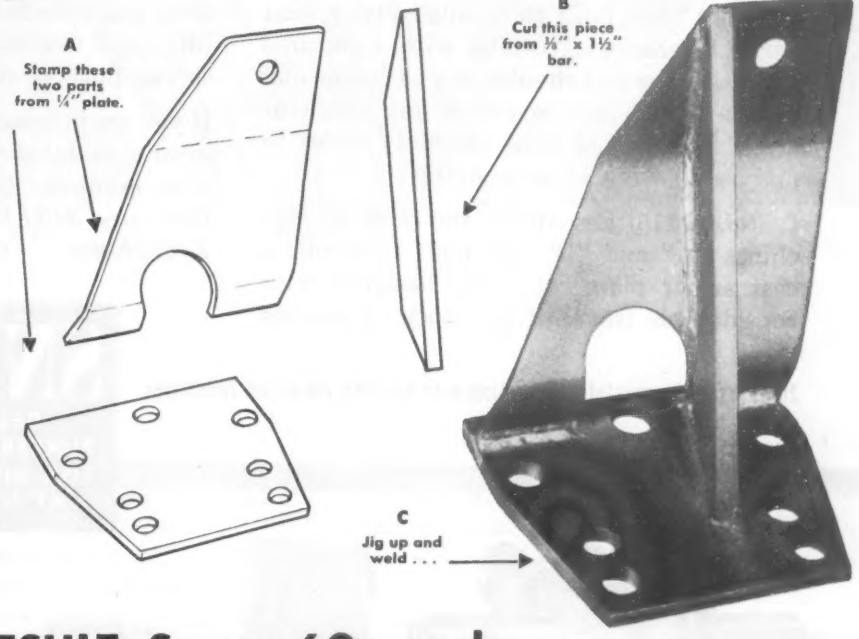
Well he knows the war was won by post-graduate thinking on production—by outsmarting outmoded procedures — through thousands of procedures such as—

"TEACH" —*he says*

HERE, PRESIDENT CAMACHO, is education for any man who wonders why he cannot sell his product, made by outdated procedures, against a competitive product which is arc welded *and come out with a profit.*

The A-B-C's of Welded Design

COSTS $1.24



COSTS 64c

RESULT: Saves 60c each

THIS bracket is typical of many parts being changed over to welded design to cut costs, and to produce a stronger, more rigid and lighter product . . . one that can be constantly improved easily and quickly.

Here is the A-B-C solution to many of your problems of today. The Lincoln Engineer will gladly help you get the results *you* want. Studies in Machine Design free on request. Ask for them on your business letterhead.

THE LINCOLN ELECTRIC COMPANY • Dept. L-1 • CLEVELAND 1, OHIO

America's greatest natural **recourse**

ARC WELDING

Snyder CAN DO YOU A GOOD TURN ON SPECIAL LATHES

Here are four center-driven lathes designed and built by Snyder to combine maximum production and accuracy with minimum handling in processing large heavy parts.

A. (No. 42595) A prewar machine for processing fabricated steel axle shaft housings for trucks. Center drive unit is small with short rear center movement actuated by air cylinders. Tail stock housing is rigidly mounted. Operations; turning various diameters near the wheel ends of the housing and facing numerous shoulders and flanges.

B. (No. 47826) Basically the same as Machine "A" but built to handle heavier, cast parts. Operations; turning with front tool blocks, facing and shouldering with rear tool blocks—which are reversible for rough or finish facing. Tail stop assembly slides in and out of work as an assembly.

C. (No. 43218) Essentially the same as Machines "A" and "B" but built to handle a cast armor plate rotor and designed with considerable travel of tail stock to provide loading space. Operations are turning and facing from both ends.

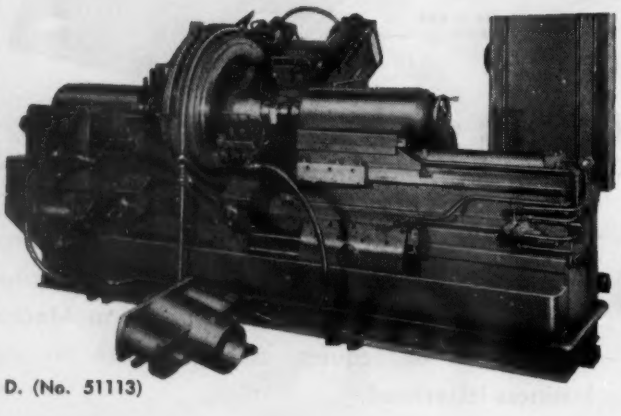
D. (No. 51113) For processing cast armor plate recoil housings. Rear tool slides have extremely long travel and conventional head stock and motor drive to center drive have been eliminated. Center drive is direct from motor and transmission in rear of machine. Operations; turning with front tool blocks and facing and shouldering with rear tool blocks.

All of these lathes are hydraulically operated and electrically controlled and operate on an automatic work cycle. The scope of operations and variety of parts indicate the versatility and flexibility of this type of Snyder special-purpose machine.

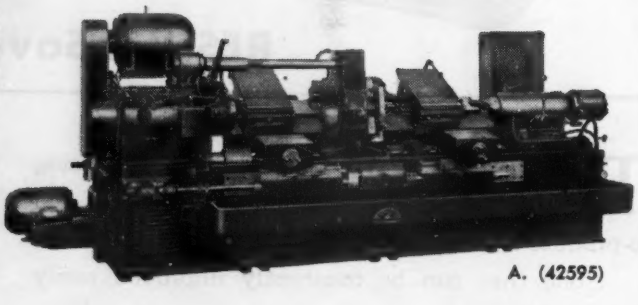
If you are interested in accurate cost-control in any metal-cutting operation, we invite your inquiries. *Snyder Tool & Engineering Company, 3400 E. Lafayette Avenue, Detroit 7, Michigan.*

20 Years of Successful Cooperation with Leading American Industries

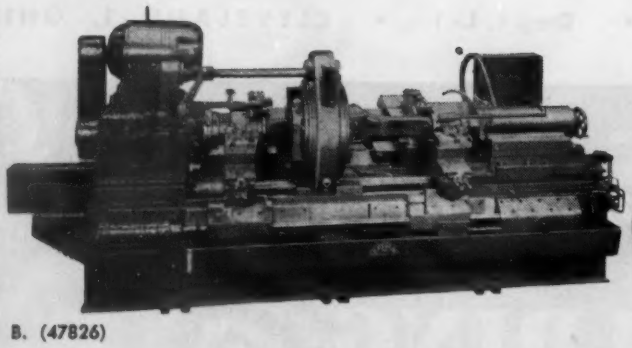
SNYDER
DESIGNERS AND BUILDERS OF MACHINERY FOR HIGH PRODUCTION AT LOW UNIT COST



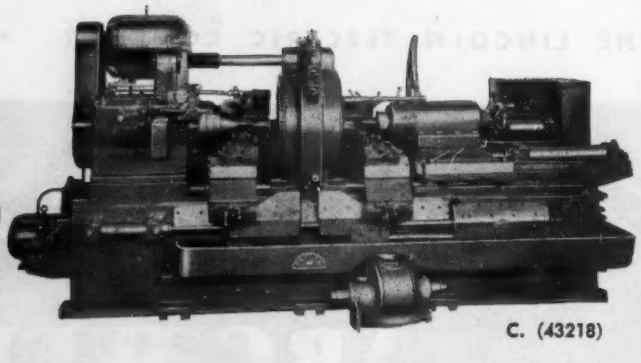
D. (No. 51113)



A. (42595)



B. (47826)



C. (43218)

THE IMPROVEMENT OF METALS BY FORGING

There is strength and toughness for lifting stress loads, with safety to men and materials, embodied in the fibre-like flow line structure of this hook forging. It illustrates how maximum metal quality can be developed to the exact degree required for a given service condition. In forgings, you can obtain high tensile and impact strength, toughness and fatigue resistance in both simple and highly stressed parts. The development of metal quality by forging depends upon how the design of the part utilizes the fibre-like flow line strength inherent in wrought metals, and the employment of the correct forging technique for the maximum IMPROVEMENT OF METALS BY FORGING. A Steel Improvement Forging Engineer brings you 31 years of forging production experience. He can help you fortify your product with the metal quality obtainable in forgings.

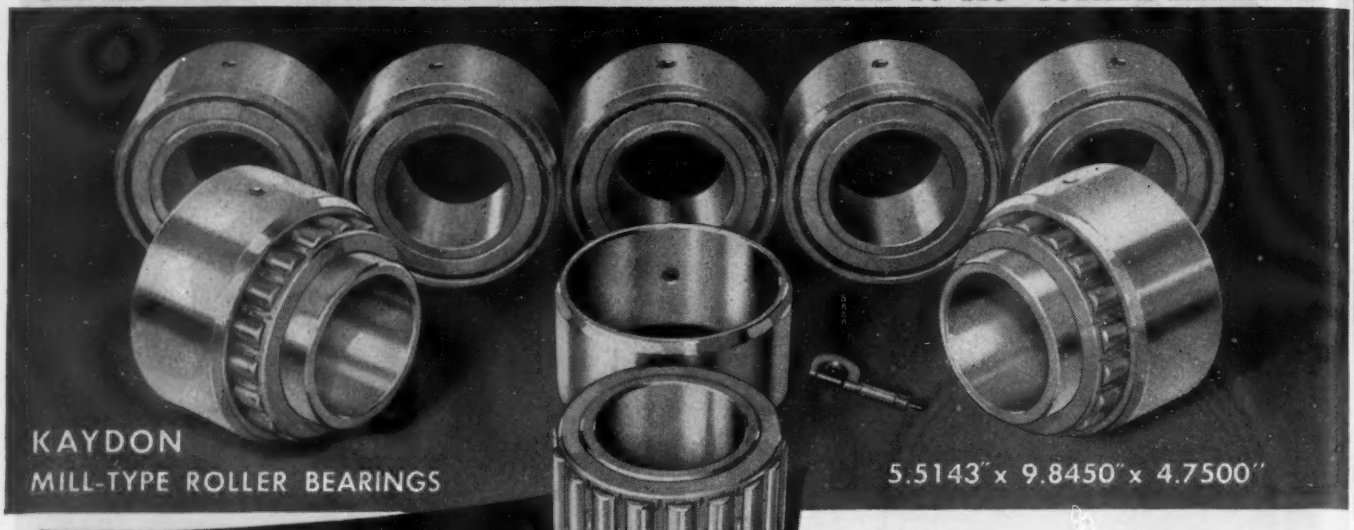
Reference Data Booklet presents many new ideas on forgings and their applications in many different types of equipment. Copies available to engineers, metallurgists and executives.

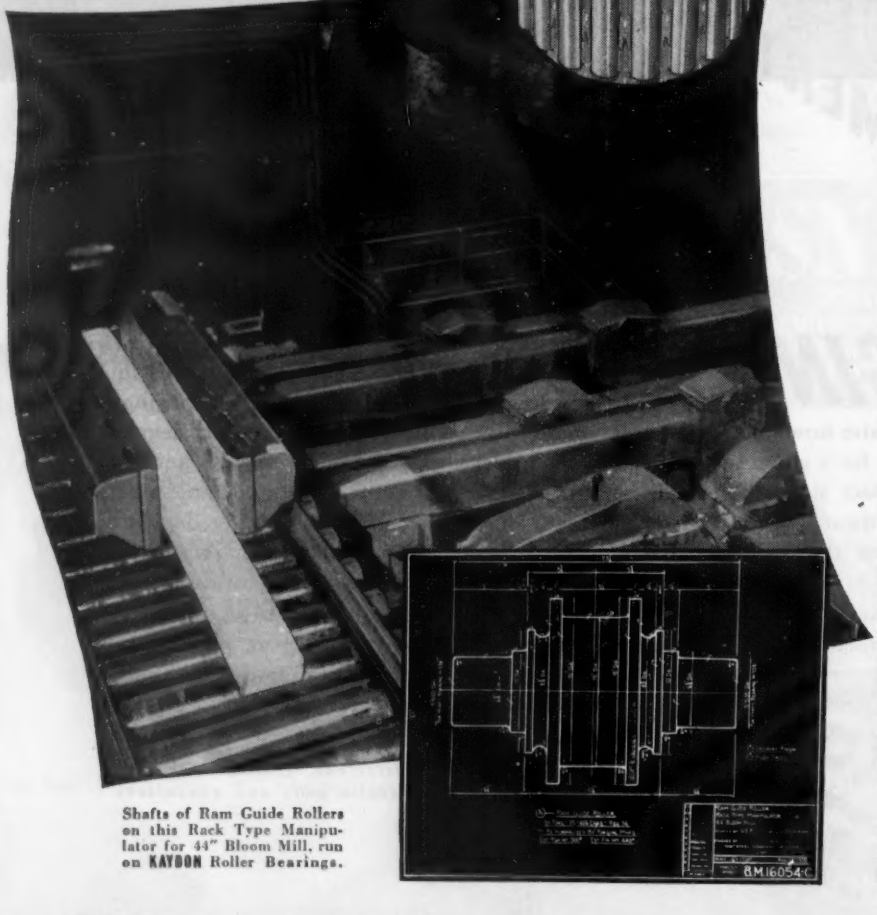
THE STEEL IMPROVEMENT & FORGE CO.

942 East 64th Street CLEVELAND, OHIO

Contact KAYDON *of Muskegon*

FOR ALL TYPES OF BALL AND ROLLER BEARINGS 4" BORE TO 120" OUTSIDE DIAMETER





Shafts of Ram Guide Rollers on this Rack Type Manipulator for 44" Bloom Mill, run on **KAYDON** Roller Bearings.

Hot and Heavy Loads for KAYDON *Bearings...*

IT takes mighty rugged high-precision bearings to stand up under terrific heat and heavy loads of white-hot steel billets passing over ram guide rollers of a rack-type manipulator in a 44" Bloom Mill, as shown here. Big, husky **KAYDON** W-228 Mill Type Roller Bearings (see dimensions above) . . . engineered for load capacity of 137,000 lbs. at 100 RPM . . . are performing successfully, under extremely high temperatures, with rams traveling 1700 feet every hour of the day.

That is typical of the many tough jobs **KAYDON** Bearings are "taking in stride". **KAYDON**, specializing in engineering and production of all types and sizes of ball and roller bearings from 4" bore to 120" O.D., also offers complete facilities for atmospheric controlled heat treating, flame hardening, precision heat treating, salt-bath and sub-zero conditioning and treatment, microscopy, physical testing, and metallurgical laboratory services.

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Counsel in confidence with **KAYDON**. Capacity is available now for production of all types and sizes of **KAYDON** Bearings.

KAYDON *Types of Standard or Special Bearings:*

Spherical Roller • Taper Roller
Ball Radial • Ball Thrust
Roller Radial • Roller Thrust

THE KAYDON ENGINEERING CORP.

MUSKEGON • MICHIGAN

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Headed your way—

THE NEW BLACK ARROW LINE

of Gas Cutting and Welding Apparatus. Black Arrow is the new, packaged line of high quality, precision-built Gas Cutting and Welding Apparatus. Products range from complete outfits through a broad selection of torches, tips, regulators, accessories and supplies. You'll hear more about Black Arrow from your local jobber—soon.

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PIONEERS IN GAS CUTTING AND WELDING APPARATUS SINCE 1907

for Materials

FROM MINES

TO FURNACE

TO FINISHED PRODUCT

TO SCRAP

JEFFREY *has the* REDUCTION KNOW-HOW

There's a different material, a different reduction problem, in each step of steel making. Jeffrey reduction engineers know them all, can furnish the right equipment for every application.

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THE JEFFREY MANUFACTURING COMPANY

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NOVEMBER, 1945

COPPER ALLOY BULLETIN

REPORTING NEWS AND TECHNICAL DEVELOPMENTS OF COPPER AND COPPER-BASE ALLOYS

Prepared Each Month by Bridgeport Brass Co. "Bridgeport" BRASS CO. *Headquarters for BRASS, BRONZE and COPPER*

Correct Selection of Lubricants for Cupping, Stamping, Machining

With the removal of wartime restrictions on copper-base alloys and the ending of make-shift substitutions, many industries are again using brasses, bronzes, and the improved copper-base engineering alloys. A discussion of the selection and use of lubricants and coolants in fabricating these materials should be welcome at this time.

Drawing Lubricants

To reduce friction to the minimum and prevent metal to metal contact, a lubricant is used. Without some medium between the metal being formed and the dies, the metal would soon build up on the tools and dies and would either render the pieces totally unsatisfactory for further fabrication or involve very high cost to remove scratches.

To be truly effective, the lubricant used must maintain a film between the tools and the metal being worked. In order to do this, it must first wet and cover the entire metal surface and have sufficient body to remain in place under forming pressures. When applied, it must be capable of easy removal and must not stain the metal. Selection of lubricants depends on:—type and severity of cold working, type of metal working equipment, quantity of work required, means of applying lubricant and cost.

The most common types of lubricants are:—

Soap or Soap Pastes—animal or vegetable oil, oil soaps containing tallow or palm oil or similar oil plus special body mineral oils.
Lard Oils.
Lard Oils and Tallow Mixtures.
Lard Oils and Mineral Oil Mixtures.
Vegetable Oils—rape seed, cotton seed, castor, and others.
Mineral Oils—various kinds.

For Blanking and Cupping

Soaps, when used, are diluted in ratios from one part of compound to four of water and as high as one part to twenty of water. In blanking and cupping operations, a heavier bodied lubricant is necessary. Lubricants diluted with water are probably the most economical to use if they work. The method of applying—whether the material is coated before working, sprayed or pumped on when going through the machine, dipped in the tank at the machine, or swabbed on—helps determine the kind of lubricant to use.

For Drawing and Forming

After blanking, cupping and annealing, some pieces require one or more drawing and annealing operations to finish them. In these operations, more dilute lubricants are preferred.

The lard oils are considered good lubricants for brass working, but they are more expensive than soap. Lard oil, if rancid, may cause objectionable red stains, which appear after annealing and cleaning, especially if the lubricant is allowed to remain on the work for a considerable time. Tallow, palm oil or vegetable soaps and mineral oils are often used and possess sufficient lubricating qualities. For some work as little as one pound of soap compound to ten gallons of water is sufficient. Dilute soap solutions are easily removed by washing in warm water.

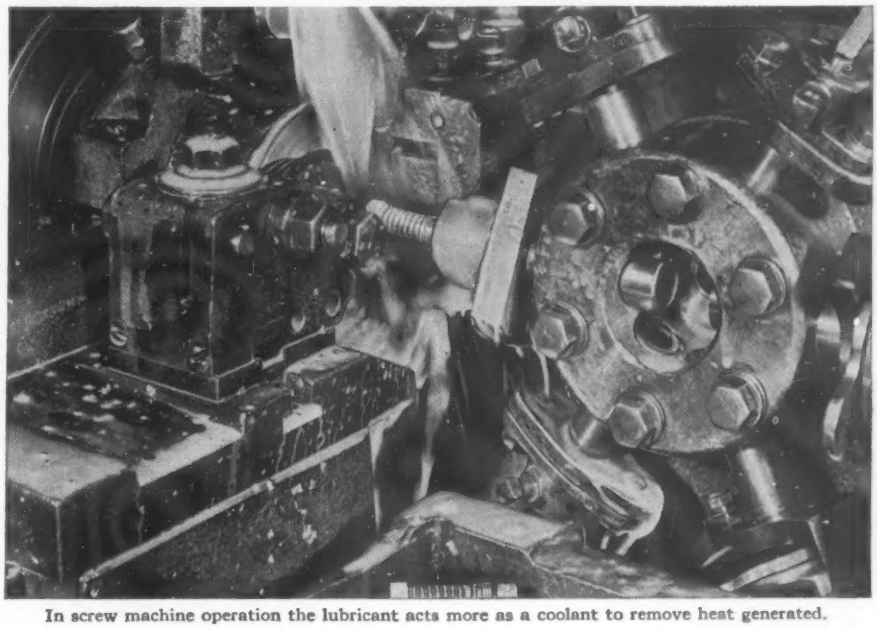
Although wet lubricants are most generally used, dry lubricants such as powdered soap have long been known for drawing wire. In the dry soap process as used for drawing and forming, 8 to 12 ounces of flake soap are used per gallon of water. The parts are then immersed in this solution and dried. The film of dry soap acts as the lubricant, permitting the added advantage of conveying, handling and storing dry cups and shells.

For Machining, Drilling or Tapping

Many types of lubricants are used, such as straight lard oils, a mixture of animal or vegetable oils, or combinations of both, as well as water-soap mixtures and soluble oils, depending upon equipment and nature of cut.

In screw machine work, the stream of lubricant serves less as a lubricator and more as a means of quickly removing the heat generated by machining operations. The cooling characteristic of the lubricants is therefore more important.

Water solutions of soluble oils conduct the heat away much more easily than straight oil lubricants and should be used for materials which require considerable tool pressure and heat up rapidly. The heat removing properties of a straight oil can be improved by the addition of more volatile liquids such as lighter oils including kerosene.



In screw machine operation the lubricant acts more as a coolant to remove heat generated.

Precautions in Use of Lubricants

It is advisable to check shipments of lubricants in order to maintain standards and prevent errors. When soap solutions require mixing with water, steam heated kettles with agitating devices are helpful. If the lubricant is improperly mixed, variations in lubricating qualities will result, and undissolved particles may clog the circulating system.

The most important precaution is to maintain a clean solution. Lubricants may become contaminated from dirty containers or from pickups from the bed of the machine. Foreign matter may also be picked up from dirty work, a condition more likely to happen in redraw work where the parts are immersed in these solutions. Any foreign matter on the parts may be washed off in the solution and later carried to the tools, resulting in scor-

(Continued on following page, column 2)

Corrosion and Biofouling of Copper-Base Alloys in Sea Water

Engineers and metallurgists interested in the corrosion resistance of copper-base alloys in sea water, will find much valuable data in a paper prepared by C. L. Bulow, Research Chemist of the Bridgeport Brass Company. This appeared in the Transactions of the Electrochemical Society ·1945, 87, 319.

During June, 1942, plans were laid for making an extensive sea water corrosion test. It was hoped that information would be obtained concerning thirty copper-base alloys which could be used as standard reference values in connection with their corrosion resistance in clean sea water. Further consideration of the problems involved in such an extensive test led to the use of the excellent facilities available at the International Nickel Company's sea water corrosion test station at the Ethyl-Dow Chemical Company, Kure Beach, N. C. This paper is a preliminary report covering the results obtained during the first year of testing at this site.

A total of 240 test pieces of copper alloys, of widely varied composition, was exposed to clean flowing sea water (60 to 90 cm./sec.) for periods of six and twelve months, during which the water temperature ranged between 2° and 30°C.

Alloys tested include Muntz Metal, high brass, cartridge brass, commercial bronze, various coppers, admiralty, aluminum brass, naval brass, manganese bronze, phosphor bronze, silicon bronzes, aluminum bronzes and cupro nickels. Corrosion rates of the different alloys are discussed and data presented on loss in tensile strength and weight, impingement corrosion, as well as general surface pitting. There are also data on the effect of alloying elements such as arsenic, aluminum and iron. There are 19 tables, 8 sets of curves as well as descriptive material and photographs.

We shall be glad to supply reprints of this paper. Kindly address your request on company stationery.

Selection of Lubricants

(Continued from preceding page, column 3)

ing of the tools or the parts during the operation. The solution may also be contaminated by acid from previous pickling operations, which has not been removed by subsequent washing. Acid solutions containing copper may break down soap solutions resulting in an insoluble metallic soap which appears as a green scum that cannot be washed away and may cause trouble in subsequent annealing operations. Soap solutions may also pick up metallic chips and other foreign matter from the machines, and it is advisable to provide strainers to remove as much of these materials as possible. Small particles, however, are difficult to remove and efforts should be made to prevent their inclusion in the solution.

Preventing Stains

After each operation involving a lubricant it is desirable to remove the lubricant as soon as possible. Some lubricants, if allowed to stand too long, may attack the surface of the brass, forming an etched spot under the corrosion products. Fatty oils, such as lard oil, are particularly active in this respect, and if the brass is subsequently annealed, red stains may be formed on the surface. Soap or any alkaline or acid solution may produce red stains of dezincified spots.

Brass parts that have been fabricated with heavy oil lubricants and require low temperature annealing, should first be cleaned to prevent the formation of carbon deposits which would result from distilling of oils at low annealing temperatures.

The question of whether fabricated brass should always be cleaned before annealing cannot be answered dogmatically, because of the variables which exist in the requirements of each individual job. The operation of removal is an added item of expense which may or may not be justified. If, however, red stains are a source of difficulty, it is very probable that removal of the lubricant as soon as possible after fabrication will relieve the situation.

It is advisable, therefore, to keep the work moving. Do not allow it to stand for days at a time, because some lubricants, when allowed to remain will react to produce green corrosion products. They are difficult to remove and are a contributor of red stains. If work must stand around, it should be dry and preferably in the annealed state, because hard drawn pieces when allowed to stand may develop season cracks which will ruin them.

NEW DEVELOPMENTS

This column lists items manufactured or developed by many different sources. None of these items has been tested or is endorsed by the Bridgeport Brass Company. We will gladly refer readers to the manufacturer or other sources for further information.

A New Plastic Coating is announced for the protection of gauging surfaces of plug, thread and special gauges. It is reputed to form a tailored-fitted cover over the gauging surface and can be easily removed and replaced after use, eliminating the necessity of coating the gauge with grease and then wiping it off. **No. 642**

Gear Tooth Spacing Checker has been designed which is reported to assure rapid, accurate checking of the base pitch and tooth spacing along the line of action on spur and helical gears. Spacing can also be checked on worn gears. Gears up to 12″ O.D. having a maximum shaft length of 18″ may be checked. **No. 643**

A Plate Duplicator has been developed to eliminate hand marking and positioning, designed to punch short runs and irregular shapes with mass production efficiency. Operation is claimed to be as simple as tracing. Holes can be punched in any direction, and as many as 11 tools including round, square and slotting tools may be set in the punch. **No. 644**

A New Countersink with a Micrometer adjustable stop has been reported with cutter capacity of ⅞″ diameter. Adjustments are made in increments of .001″ and a positive lock prevents loss of adjustment. **No. 645**

A Drilling and Countersinking Tool has been reported which permits drilling and countersinking, drilling and spot-facing, drilling and counterboring in one operation. **No. 646**

A Cleaning System for removing cutting oils and lubricants used in metalworking operations is claimed to be ideal for many simple cleaning operations where small parts are to be cleaned in limited quantities. **No. 647**

BRIDGEPORT BRASS TECHNICAL HANDBOOK

If you have not yet written for your copy of the Bridgeport Brass Technical Handbook, please do so while our supply is available. This 128-page handbook is packed with concise information and valuable tables on the characteristics and properties of all the popular copper-base alloys used in the industry. It is intended for engineers, metallurgists and purchasing agents. Use company stationery when sending your request.

PRODUCTS OF THE BRIDGEPORT BRASS COMPANY

Executive Offices: BRIDGEPORT 2, CONN.—Branch Offices and Warehouses in Principal Cities

SHEETS, ROLLS, STRIPS—*Brass, bronze, copper, Duronze** for stamping, deep drawing, forming and spinning.

CONDENSER, HEAT EXCHANGER, SUGAR TUBES—For steam surface condensers, heat exchangers, oil refineries, and process industries.

COPPER WATER TUBE.

WELDING ROD—For repairing cast iron and steel, fabricating silicon bronze tanks.

LEDRITE* ROD—For making automatic screw machine products.

"Bridgeport" BRASS

Established 1865

BRASS AND COPPER PIPE

DURONZE ALLOYS—High-strength silicon bronzes for corrosion-resistant connectors, marine hardware: *hot rolled sheets* for tanks, boilers, heaters, flues, ducts, flashings.

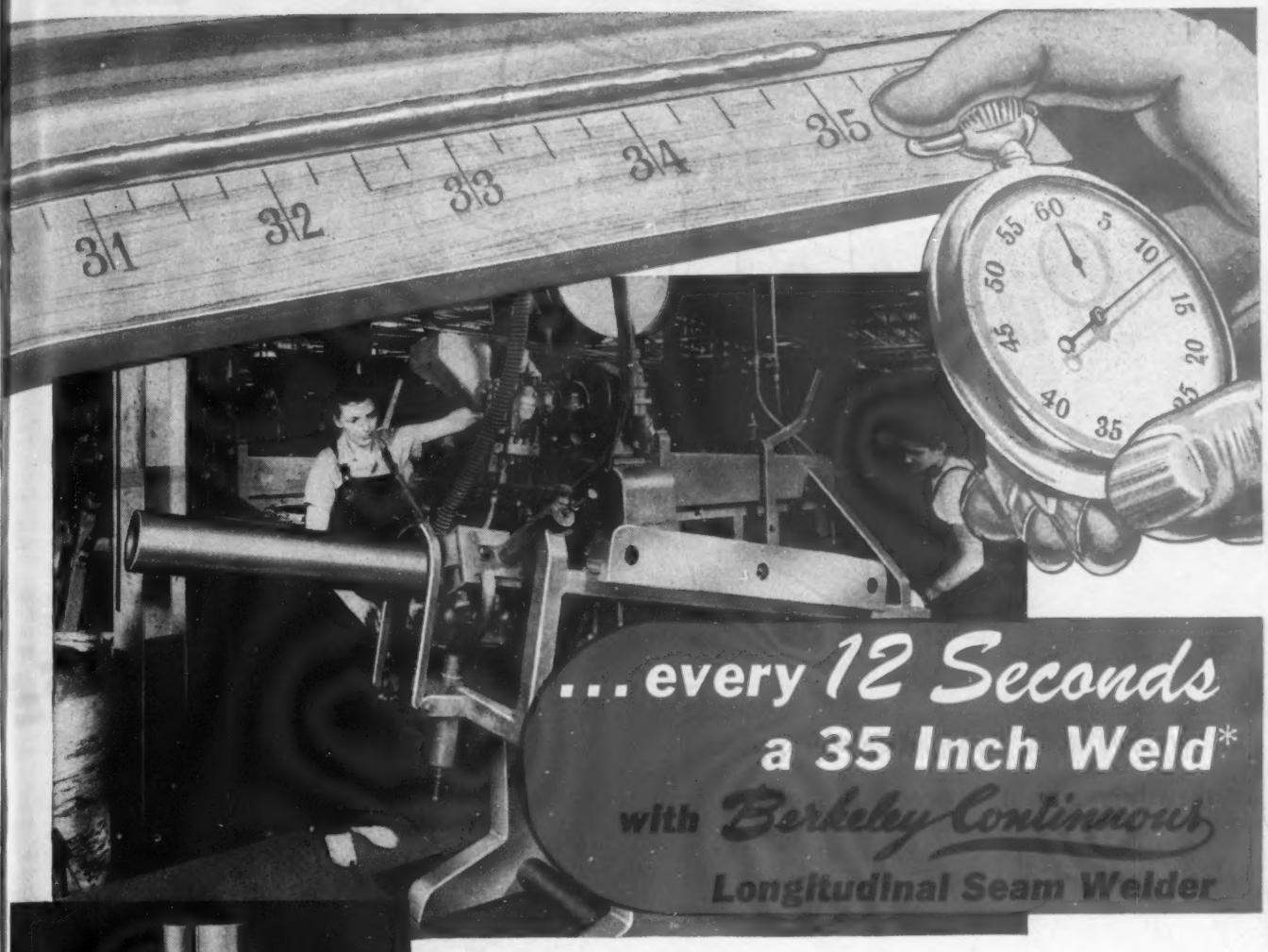
PHONO-ELECTRIC* ALLOYS—High-strength bronze trolley, messenger wire and cable.

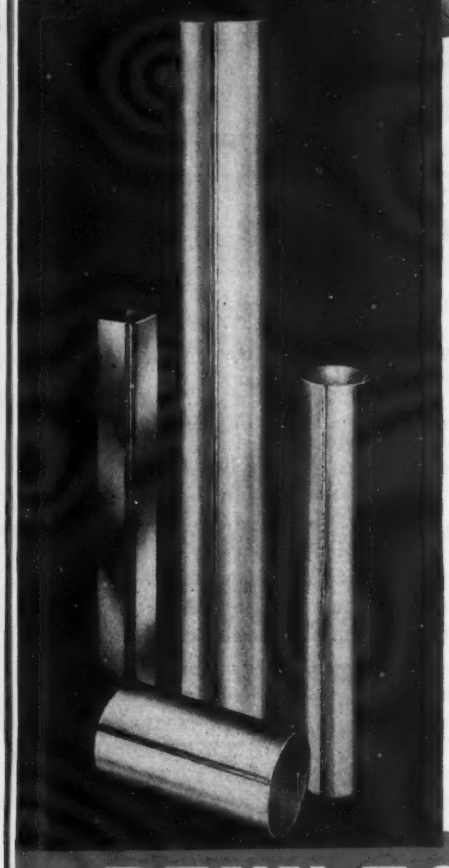
FABRICATING DEPT.—Engineering staff.

BRASS, BRONZE, DURONZE WIRE—For cap and machine screws, wood screws, rivets, bolts, nuts.

*Trade name.

BRIDGEPORT **BRASS**





Speed up Your Welding and Cut Production Costs!

The "Berkeley" . . . restricted during wartime to speeding up the vital production of critical war material . . . is again available for your requirements.

Here is what you get with the "Berkeley":

- **Faster production**
- **X-ray quality welds**
- **Reduced costs**
- **Minimum of distortion**
- **No finishing required**

Here is what the "Berkeley" will do . . . weld the seam of rounds, squares and a variety of shapes ranging from 4" to 21" in diameter . . . 18 gauge to ¼" plate. There is no substitute for the "Berkeley" used in combination with the automatic submerged electric arc.

Write us today for information about the "Berkeley" most suitable to your requirements. It is available with modifications and special features to meet the exact requirements of special applications.

*In 14-gauge steel.

PENN TOOL & MACHINE CO.

DANVILLE, ILLINOIS

accurate timing FOR LIFE

Inductive (magnetic) timing without resistors or rheostats with the new Westinghouse

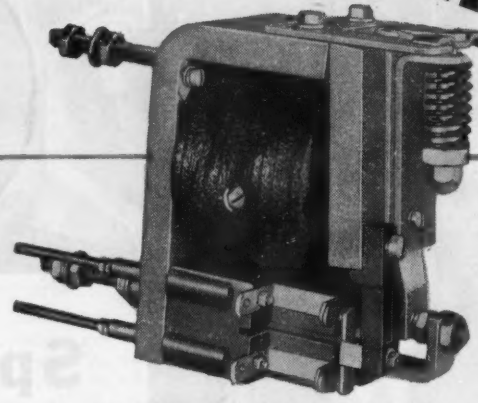
TYPE AZ TIMING RELAY

The *new* Westinghouse Type AZ Time Delay Relay will insure accurately timed acceleration in steel mill auxiliary and crane motor control for the life of the installation.

To provide wide range of time adjustment (½ to 2 sec. or 1 to 3½ sec.)—the Westinghouse Type AZ Time Delay Relay utilizes a series of copper rings or "collars" to vary the intensity of the induced magnetic field.

This simplified principle of construction makes possible a one-winding coil with no springs to adjust or orifices to clean. No rheostat or resistor is required. Once timing adjustment is made, the Type AZ Relay will operate with unvarying timing throughout the life of the installation.

The AZ Relay is one of a group of similar relays which are available for various control functions . . . For additional information on Type AZ and other relays, ask for Descriptive Bulletin 15-827. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-60617



SPECIAL FEATURES OF THE TYPE AZ RELAY

1. One-winding coil.
2. Wide range of time adjustment without resistors or spring adjustments.
3. Unit construction—all parts on one frame.
4. Knife-edge bearings for long life, friction-free operation. No lubrication required.
5. Large silver contacts insure positive contact and long life.
6. Chromium plating on magnet surfaces for resistance to corrosion and mechanical wear.

Westinghouse

STEEL MILL CONTROL

FACTORY-ASSEMBLED CONTROLLER DESIGNED FOR STEEL MILL CONTROL

THIS LITTLE *Wheel* MAKES A BIG DIFFERENCE IN PRODUCTION

It's the Gisholt Hydraulic Speed Selector.

Through this one dial type control, the turret lathe operator can instantly shift to any one of 12 spindle speeds without stopping the spindle or releasing the main drive clutch. This means that no time is wasted in shifting gears—no calculations from cutting speed to spindle speed are necessary. When the job is set up and ideal machining speeds determined, with reference to the diameter of the work, the operator can pre-set the Speed Selector for each step in the machining process, merely touching a trip to effect each successive change.

Instant in response and power-operated, the Gisholt Hydraulic Speed Selector not only saves time between cuts but also increases production by making it simple for the operator to use the most efficient speed for each cut. It is available on all sizes of Gisholt Saddle Type and Ram Type Turret Lathes.

THE GISHOLT HYDRAULIC SPEED SELECTOR can be used in two ways: DIRECT or PRE-SET. Thus the operator can select each speed as desired by turning the wheel, or he can select the speed in advance of the change. Ask for full information.

LOOK AHEAD...KEEP AHEAD...
WITH GISHOLT IMPROVEMENTS
IN METAL TURNING

GISHOLT MACHINE COMPANY

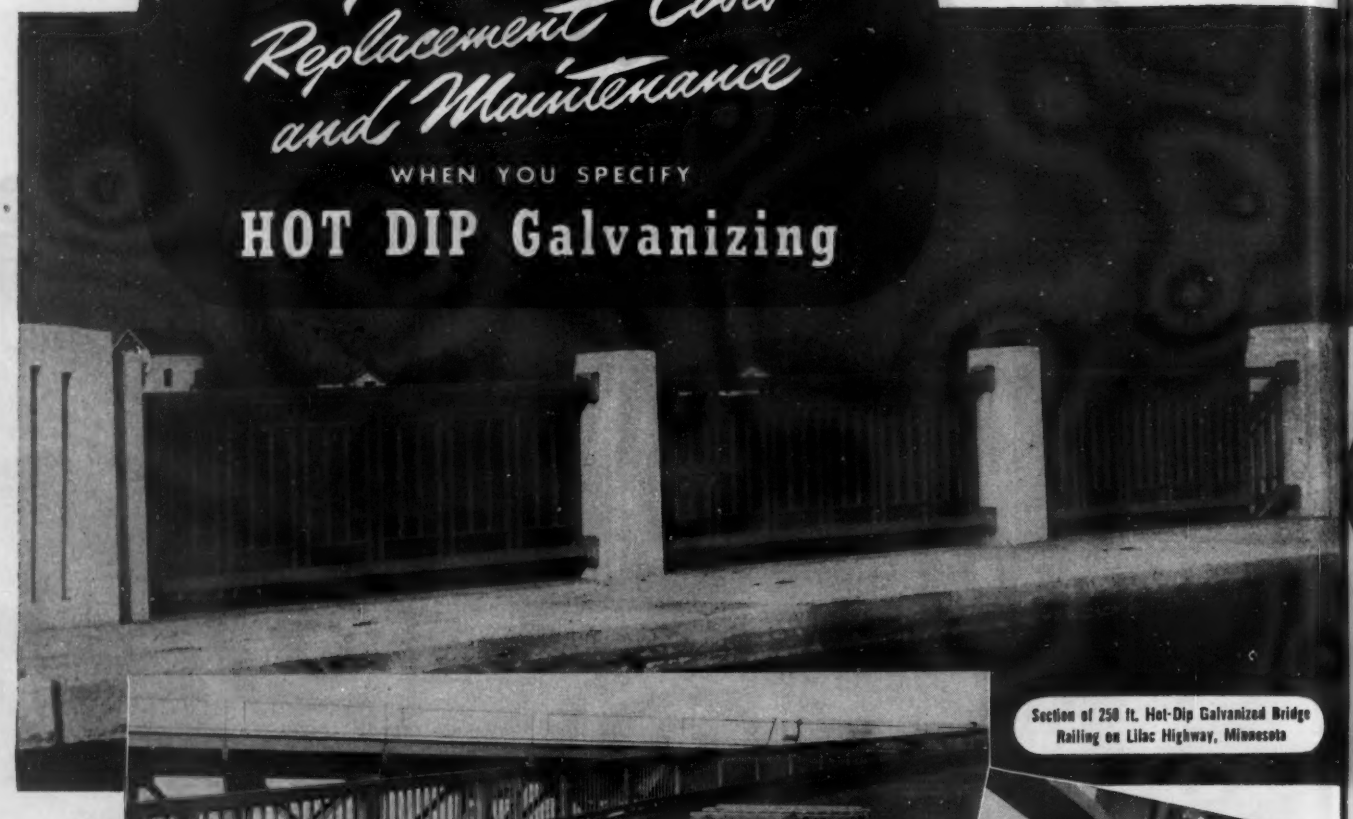
1217 East Washington Avenue, Madison 3, Wisconsin

TURRET LATHES • AUTOMATIC LATHES • BALANCING MACHINES • SPECIAL MACHINES

You Save on Replacement Costs and Maintenance

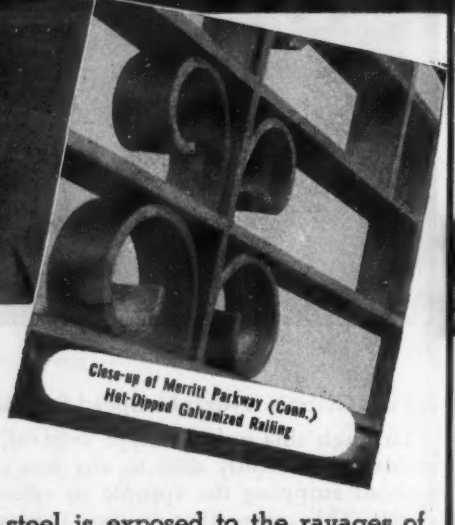
WHEN YOU SPECIFY

HOT DIP Galvanizing



Section of 250 ft. Hot-Dip Galvanized Bridge Railing on Lilac Highway, Minnesota

Hot-Dip Galvanized Railing on approach to Golden Gate Bridge, San Francisco



Close-up of Merritt Parkway (Conn.) Hot-Dipped Galvanized Railing

Protection and costly maintenance on steel railings on Minnesota's Bridges were a problem until "Hot-Dip Galvanized" was written into the specifications for the Lilac Highway Bridge. Back in 1941, Hot-Dip Galvanizing—put to the test by the State's Department of Highways—furnished the answer to future rust and corrosion problems.

More and more—engineers, familiar with the Hot-Dip Galvanizing method of fusing molten zinc with base metal, are specifying this protection —*the utmost in rust prevention.*

Proven facts—actual case histories—prove that bridge railing, or *any installation* where iron or steel is exposed to the ravages of rust and corrosion, will last far beyond the normal expectancy and render greater uninterrupted service when Hot-Dip Galvanized.

For estimates on your zinc protective coatings or for the name and address of the member nearest you write direct to: American Hot Dip Galvanizers Association, Inc., First National Bank Building, Pittsburgh 22, Penna.

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first choice!

The battle cry of peacetime industry is greater production, lower costs, and it can be brought about by savings in time, material and effort. And that is why Hansen couplings tie in with today's trend. Hansen couplings have won their international popularity on their performance, a performance that spells economy on every job.

For instance the Hansen Air couplings save time, effort and air because all the operator has to do is push plug into socket it is connected, locked and air is automatically turned on, all in a matter of a few seconds. There is no twisting or turning to connect or disconnect, no binding or jamming of parts as all moving parts work freely, because they are fully protected. To disconnect operator merely slides sleeve back with thumb, plug is ejected, it is disconnected and air is automatically shut off. Operator never leaves his work to connect or disconnect coupling, or even to turn air on or off. He wastes no time, effort or air. Full swivel action prevents kinking of hose. There's a Hansen coupling made for air, oil, grease, oxygen, acetylene and gasoline, each of which will save time, effort and material on any job.

Send in for free industrial catalog.

THE HANSEN MFG. CO.

1786 EAST 27th STREET • CLEVELAND 14, OHIO

S-M-O-O-T-H PERFORMANCE...

TYCOL
NO-RUST-OLS
New Powerful Rust Preventives...
Engineered for Easy Application
These new Tycol Rust Preventives solve the problem of rust prevention on: stock in storage, parts in production, and machinery standing in warehouses awaiting reconversion.
Engineered expressly to meet U. S. Army and Navy specifications, their low viscosity and low pour lend themselves to applications — down to 50° F — by spraying, brushing, swabbing or dipping. Compounded from the finest mineral oil base, Tycol NO-RUST-OLS do not dry to a wax-like coating, thus they can be removed by a simple degreasing operation.
If moisture is present — whether from indoor storage, or mild "sweating" during factory handling, call or write your nearest Tide Water Associated office for complete details about the "rust protection" afforded by Tycol NO-RUST-OLS.
DRUMS! DRUMS! DRUMS!
War needs make it imperative that all empty drums be returned immediately.

TYCOL INDUSTRIAL
ENGINEERED FOR EVERY

M-A-X-I-M-U-M EFFICIENCY

with TYCOL

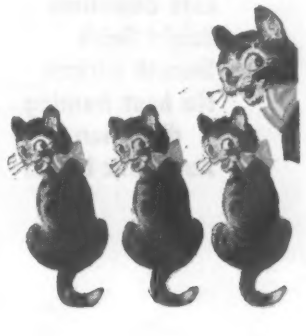
ENGINEERED LUBRICATION

Under all conditions the proved performance of Tycol lubricants more than meets their recommended service.

Rigidly controlled and tested during manufacture . . . and refined from the highest grade crudes, Tycol oils and greases (whether straight mineral or compounded) retain their uniformity* within each classification — from the first drum to the last. This unvarying high quality, plus the scope of the line, accounts for Tycol's wide acceptance among operators interested in maximum production . . . top efficiency . . . lowest operating cost.

Whatever your lubrication need, there is a Tycol oil or grease expressly engineered to afford greater economy . . . longer machine life for every type of equipment. Let a Tide Water Associated engineer help you select the best one for your particular need. Call, write or wire your nearest Tide Water Associated Office for full details.

Makers of Famous Veedol Motor Oil



*** UNIFORMITY.** For clear, concise descriptions of the basic tests used to determine important lubrication properties — Pour Point, Extreme Pressure, Uniformity and many others — consult Tide Water Associated's informative handbook "Lubricania". For your FREE copy write: Tide Water Associated Oil Company, 17 Battery Place, New York 4, N. Y.

LUBRICANTS
SERVICE NEED

TIDE WATER ASSOCIATED OIL COMPANY
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PRINCIPAL OFFICES
BOSTON · PHILADELPHIA
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NEW CENTERLESS THREAD GRINDING

Reduces Costs Up to 80%

The new method of centerless thread grinding reduces production costs of threaded parts an unusually large amount. This is due to the great productiveness of the Centerless Thread Grinder developed by LANDIS TOOL engineers.

Increases of 500% or more in output per worker help cut costs. An automatic loader steps up output still more. Other factors that help reduce costs as much as 80% are: change from 100% inspection to spot inspection; almost no rejects; short setup time; fast wheel recrushing with built-in crusher. Multiple point grinding with the Centerless Thread Grinder produces strong threads of accurate form. Working from solid hardened stock eliminates final heat treatment and gives a bright, smooth finish of exceptional accuracy.

The new LANDIS TOOL Centerless Thread Grinder can produce a wide variety of thru-feed threaded parts in addition to socket set screws. Our engineering department is available for consultation on your threading problems.

26A

ADVANTAGES

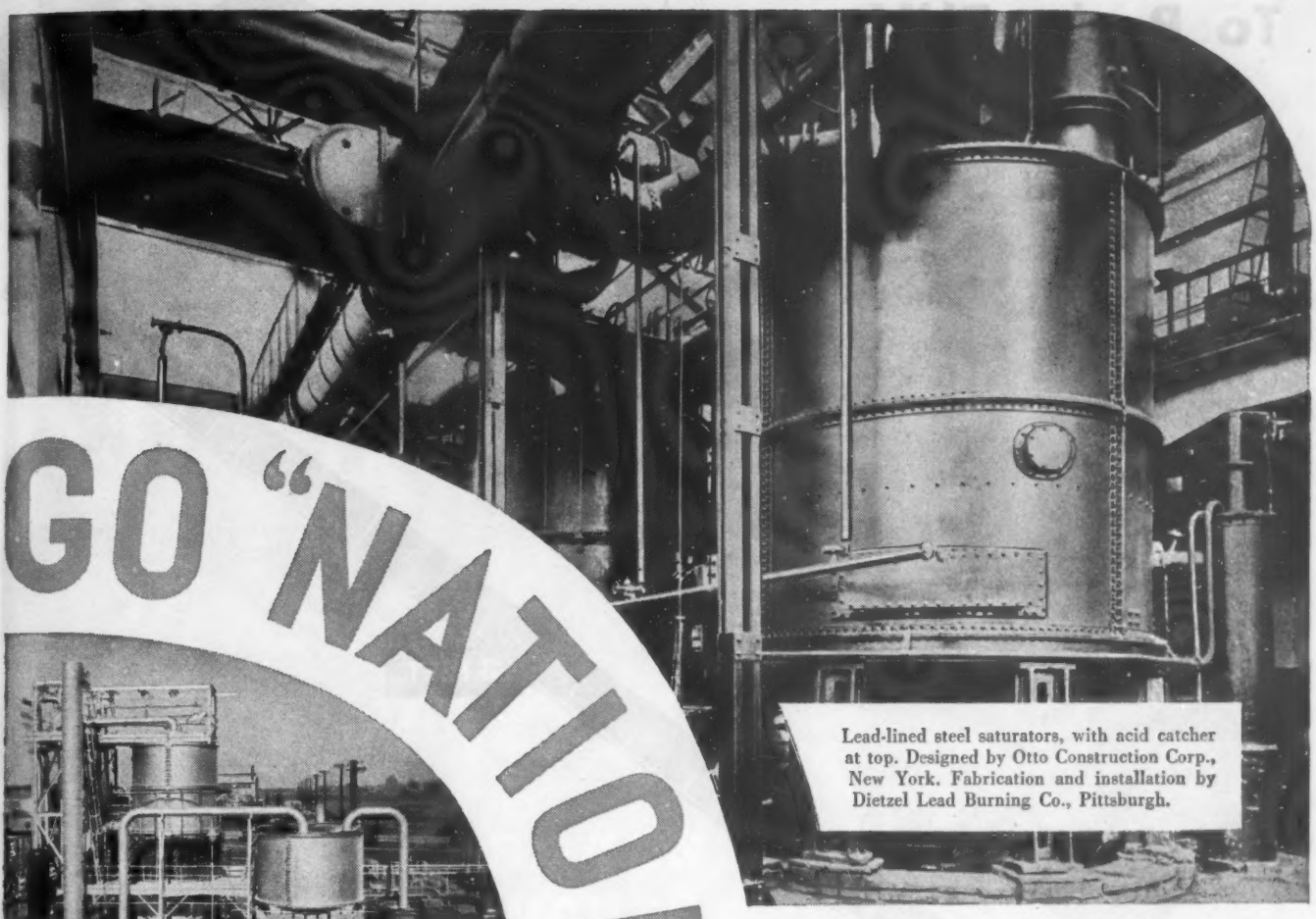
- Continuous thru-feed
- Fewer rejects
- Less inspection
- Less downtime
- Bright finish
- Smooth surface
- No heat treating distortion
- Automatic loader

LANDIS TOOL

Precision Grinders

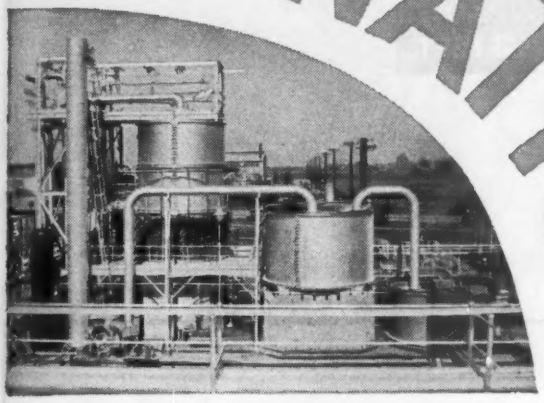
Socket head screws centerless ground from solid hardened stock. Sizes from 5/8"x 1¼" 11 pitch to No. 4"x 3/8" 40 pitch.

LANDIS TOOL CO., WAYNESBORO, PA.



Lead-lined steel saturators, with acid catcher at top. Designed by Otto Construction Corp., New York. Fabrication and installation by Dietzel Lead Burning Co., Pittsburgh.

GO "NATIONAL" FOR LEAD



Simonson-Mantius acid recovery plant, including a super-vacuum concentrator and feed tank for concentrating spent acid. Designed and built by National Lead Company.

Battery of ten homogeneous lead-lined, vertical steel blow cases, ready for shipment from National Lead to a chemical plant.

Metal washing machine, lined with antimonial lead and fitted with pipe of same material. Equipped with header-type lead heating coils. All lead burning by American Lead Burning Co., Linden, N. J.

Wherever industry uses lead to control acid, there you'll find men in the know saying, *Go "National" for Lead.* For here at National Lead, are not only the *materials* but the *experience* to take care of any lead installation. For example:

(1) Tellurium Lead was pioneered by us . . . to give extra corrosion resistance at elevated temperatures and longer life under vibratory stress.

(2) Another contribution is our wide variety of acid handling equipment, including lead-lined, lead-covered or all-lead valves, pipe and fittings.

(3) We also design, and fabricate to specification, special homogeneous lead-bonded apparatus, such as evaporators, autoclaves, pressure stills and agitators.

(4) Even complete sulfuric acid recovery plants are planned and built. These feature the patented Simonson-Mantius process, with its advantages of low temperature and high yield.

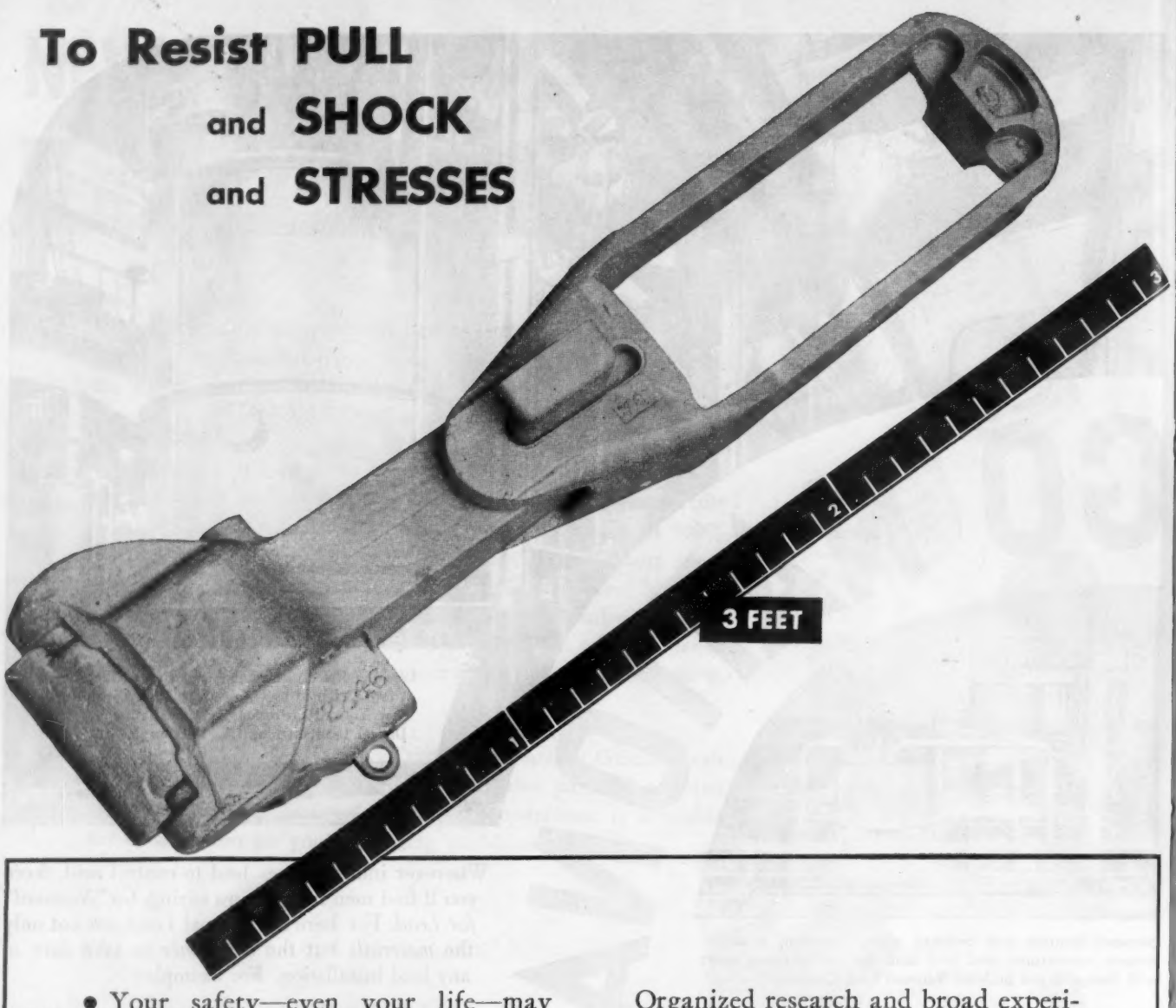
(5) And, of course, National Lead has long supplied sheet, pipe, coils, and fittings of chemical and antimonial lead.

No matter what your needs...
Go "National" for Lead!

LEAD

NATIONAL LEAD COMPANY
111 Broadway, New York 6, N. Y.
Offices and Plants in Principal Cities and Canada

To Resist PULL and SHOCK and STRESSES



• Your safety—even your life—may depend upon the performance of the modern cast steel railway coupler and yoke.

It must have the tensile strength to stand the pull of the heaviest trains at high speeds, plus the impact resistance to stand the shocks and stress of sudden stops and starts.

And it is economical to produce, because the casting process is the simplest method of turning out complicated shapes in steel, with selected mechanical properties prescribed in advance.

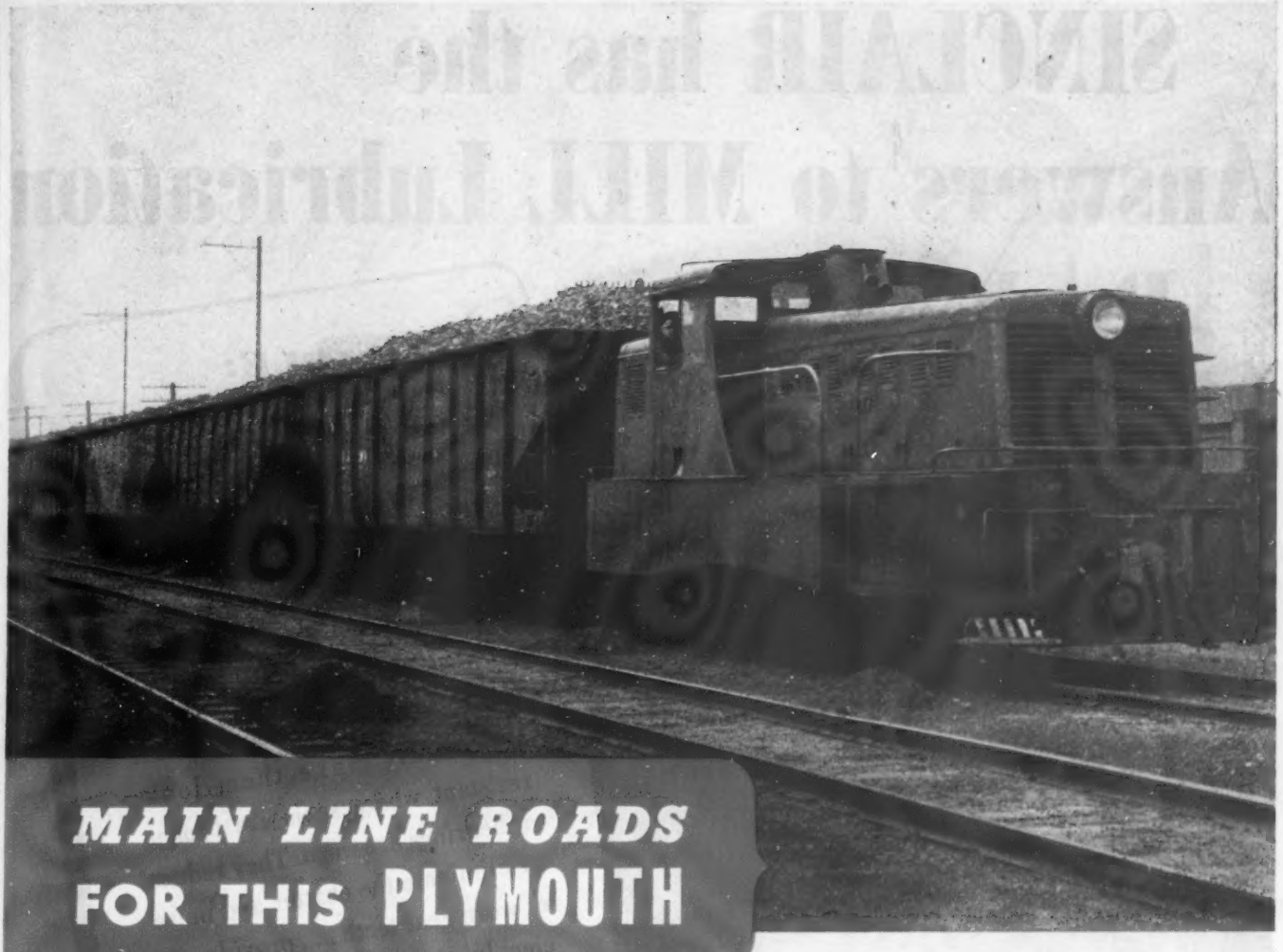
Organized research and broad experience enable your steel foundryman to supply you with steel formed to the desired shape, with the properties, or combination of properties, your work demands.

Railroads, and a hundred other industries, have proved for you the versatility and the economy of properly designed steel castings, and their complete dependability in service.

Discuss it with your foundryman, or write to Steel Founders' Society, 920 Midland Bldg., Cleveland, Ohio.

MODERNIZE AND IMPROVE YOUR PRODUCT WITH

STEEL CASTINGS



MAIN LINE ROADS FOR THIS PLYMOUTH

It takes plenty of power to hook on to a load like this and walk right off with it—but Plymouth does it with ease! One of two such units serving a large mid-West steel plant, these locomotives are called upon to handle big jobs like this every day. On the big jobs—and on the smaller ones, too—Plymouth has earned a reputation for delivering a full day's work, regardless of operating conditions.

Dependable industrial transportation, the kind that keeps production up and costs down, is what you've been looking for. There's a world of satisfaction in putting Plymouth on the job . . . it means the end of your transportation difficulties, for Plymouth is designed and built to deliver the goods.

Big jobs, small jobs, unusual operating conditions, a Plymouth takes them all in stride. Hundreds of satisfied users can tell you about the dependable, low-cost service they enjoy. Better still, write us and outline your problem.

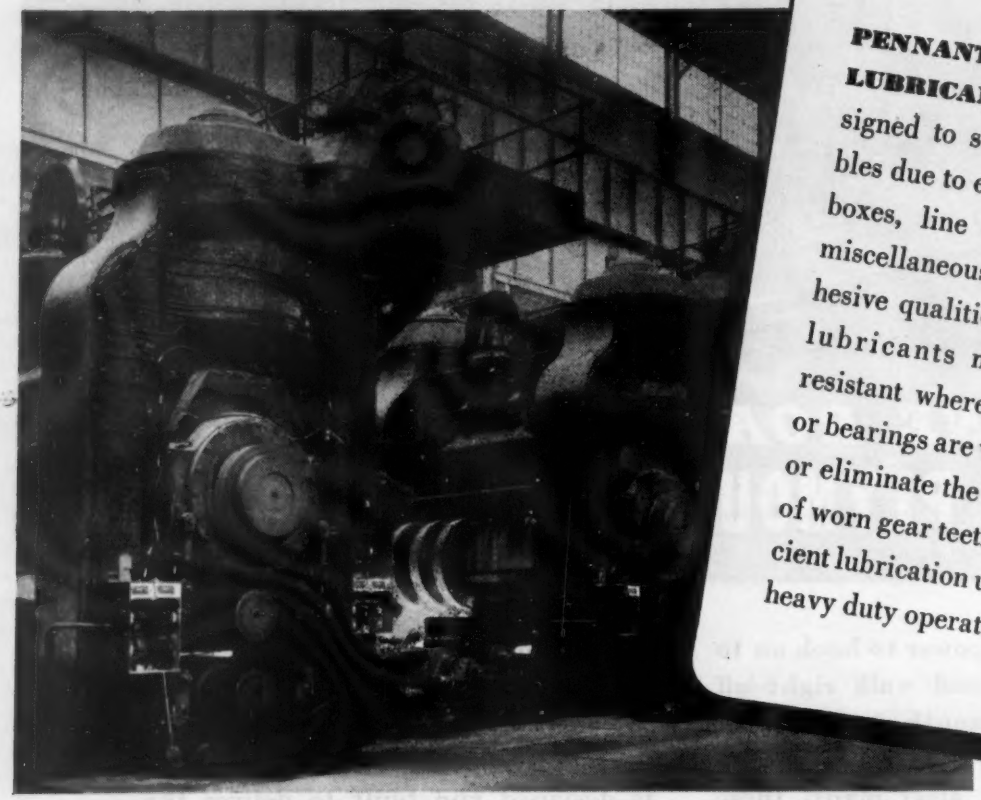
TRACK HAULAGE IS CHEAPER HAULAGE

PLYMOUTH LOCOMOTIVES

GASOLINE, DIESEL MECHANICAL AND DIESEL ELECTRIC

PLYMOUTH LOCOMOTIVE WORKS • Division of The Fate-Root-Heath Co., Plymouth, Ohio, U.S.A.

SINCLAIR has the Answers to MILL Lubrication Problems



FOR EXAMPLE:

PENNANT NO-DRIP LUBRICANTS are specially designed to solve lubrication troubles due to excessive wear in gear boxes, line shaft bearings, and miscellaneous bearings. The adhesive qualities of these Pennant lubricants make them leak-resistant where seals are broken or bearings are worn. They reduce or eliminate the chatter and noise of worn gear teeth . . . provide efficient lubrication under continuous heavy duty operation.

• **In cooperation with mill engineers and equipment manufacturers, Sinclair has developed specialized heavy duty lubricants which help solve today's equipment replacement and repair difficulties. Sinclair lubricants for iron and steel mills are designed to prolong machine life by partial correction of mechanical conditions which impair operating efficiency and may lead to breakdown.**

A complete guide to simplified mill lubrication is available to you. Write for it.

SINCLAIR INDUSTRIAL OILS

FOR FULL INFORMATION OR LUBRICATION COUNSEL WRITE SINCLAIR REFINING COMPANY, 630 FIFTH AVENUE, NEW YORK 20, N. Y.

Sitting pretty . . .

and 7 pounds lighter

Made of Mazlo Magnesium, this new lightweight seat, designed by Douglas Aircraft Company engineers, reduces the weight per 21-passenger plane by 147 pounds. Yet it costs but slightly more than half the price of the old type chairs. This savings in weight alone, can mean an added passenger, or the revenue on 147 pounds of cargo.

This example of what magnesium is doing for the aviation industry can apply to your products, too. Magnesium alloys give the required strength and dependability, along with maximum savings in weight. It's the perfect metal for things that move, must be carried, must endure.

American Magnesium engineers will gladly sit down with you and help you employ magnesium to best advantage. Write Aluminum Company of America, Sales Agent for American Magnesium Products, 1703 Gulf Building, Pittsburgh 19, Penna.

MAGNESIUM MAZLO PRODUCTS

AMERICAN MAGNESIUM CORPORATION

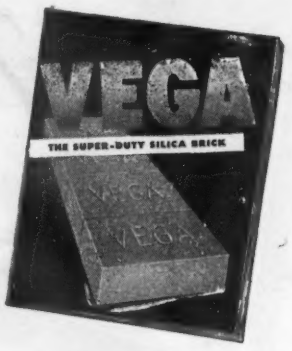
SUBSIDIARY OF ALUMINUM COMPANY OF AMERICA

To those still waiting for

VEGA

THE SUPER-DUTY SILICA BRICK

If you have not already received your copy of this fact-filled booklet on VEGA, The Super-Duty Silica Brick, send for it today. Learn how VEGA was developed — and how its 60° to 100° higher refractoriness under load gives longer life in open-hearth roofs, permits higher temperatures — and also increases tonnage output.



IN an effort to meet the constantly increasing demand for VEGA production, facilities for this super-duty silica brick have been materially expanded. However, even today's greater output still falls short of the amount required to fill present demands promptly. As soon as conditions will permit, the production capacity will be further increased. We hope and believe it will not be too long now until orders can be placed with the expectation of actually getting VEGA within a reasonable time. Meanwhile we ask your continued patient indulgence in reference to the unavoidable delay in VEGA shipments.

IMPORTANT NOTICE!

Licensing Arrangement

A definite contribution to longer furnace life and greater steel production, VEGA brick should be made available as soon as possible to the largest number of steel producers.

Harbison-Walker will therefore license other responsible producers of silica refractories to manufacture brick under VEGA patents.

Super-duty silica refractories, made under VEGA patents by other manufacturers, will carry this identifying symbol of plus quality + following the manufacturer's established brand name.

HARBISON-WALKER REFRACTORIES CO.

AND SUBSIDIARIES

World's Largest Producer of Refractories

GENERAL OFFICES • PITTSBURGH 22, PENNSYLVANIA

WAREHOUSES IN NINE KEY CITIES

Serve you promptly!

WE HAVE nine large warehouses* located in key manufacturing areas from which deliveries can be made quickly to any point. During war years these warehouses have done a good job of living up to their famous reputation for fast service. Today our stocks are larger — there is a wide variety of steel available for immediate shipment, including all standard grades and sizes of U·S·S Stainless Steel and a complete line of Carbon Steel Products. When you need steel in a hurry, phone, write or wire our nearest warehouse. We will continue to exert our best efforts in making deliveries to meet your requirements. Our service has helped many customers avoid serious delays in production. Your orders and inquiries receive prompt, careful attention.

***Our Boston warehouse has been taken over by the Navy for storage of vital supplies. But we maintain our Boston Sales Office to expedite service to our New England customers from all our other warehouses.**

UNITED STATES STEEL SUPPLY COMPANY

CHICAGO (90) 1319 Wabansia Ave., P. O. Box MM—BRUnswick 2000
BALTIMORE (3) Bush & Wicomico Sts., P. O. Box 2036—GILmore 3100
BOSTON (34) 176 Lincoln St., Allston, P. O. Box 42 STAdium 9400
CLEVELAND (14) 1394 E. 39th St., HEnderson 5750
MILWAUKEE (1) 4027 West Scott St., P. O. Box 2045—MItchell 7500
NEWARK (1), N. J. Foot of Bessemer St., P. O. Box 479—BIgelow 3-5920 REctor 2-6560, BErgen 3-1614
PITTSBURGH (12) 1281 Reedsdale St., N. S. CEdar 7780
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TWIN CITY 2545 University Ave., St. Paul (4), Minn. NEstor 2821

EVERY SUNDAY EVENING, United States Steel presents *The Theatre Guild on the Air*. American Broadcasting Company coast-to-coast network. Consult your newspaper for time and station.

UNITED STATES STEEL

USE THESE STANDARD GEAR DRIVES

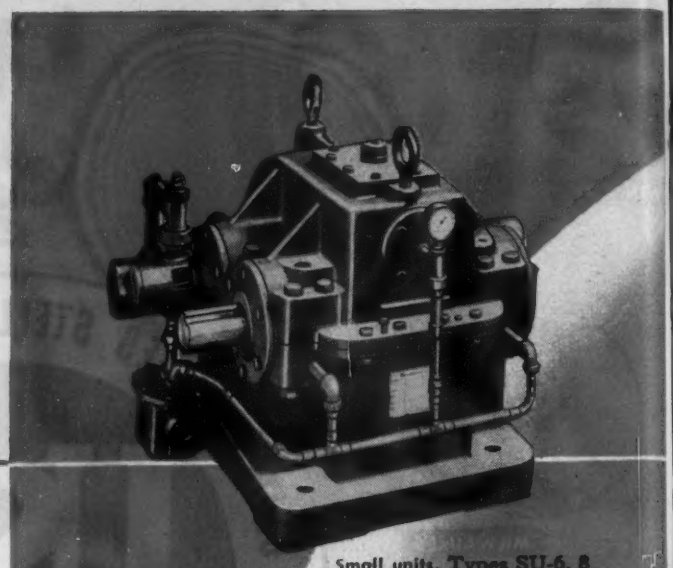
The standard line of Westinghouse Type SU high-speed gear units is built especially to increase motor and Diesel engine speeds to the requirements of centrifugal pumps, centrifugal blowers, high-speed generators and compressors.

These precision-built, high-speed gear units have special advantages for all industrial and commercial applications up to 2000 hp and 9000 rpm.

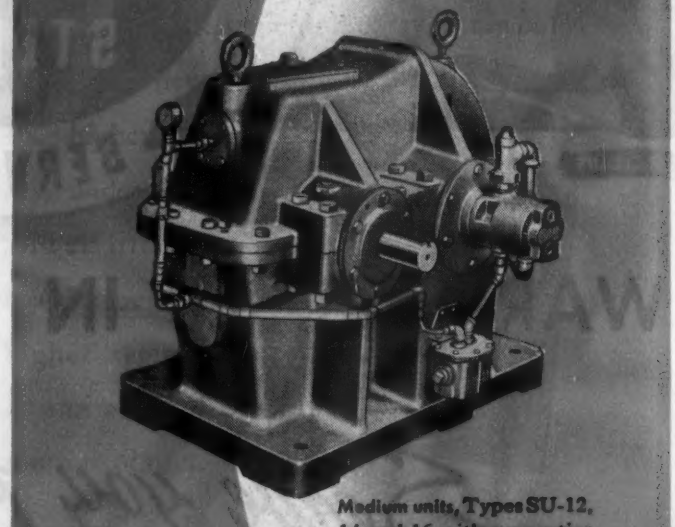
For example, the double helical gears are hobbed by high-precision methods and are dynamically balanced. Oversize bearings and shafts add protection against torsional deflections under load variations. Minimum maintenance is assured by a completely self-contained, forced-feed lubrication system.

On motor drives, these drives are matched units—motor, control and speed-increasing gear all built by Westinghouse.

Today, Westinghouse research engineers are performing many tests on new industrial gear units that will parallel tomorrow's special gear applications. Take advantage of this research . . . of the thirty-eight years of Westinghouse experience in gearing. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-07233



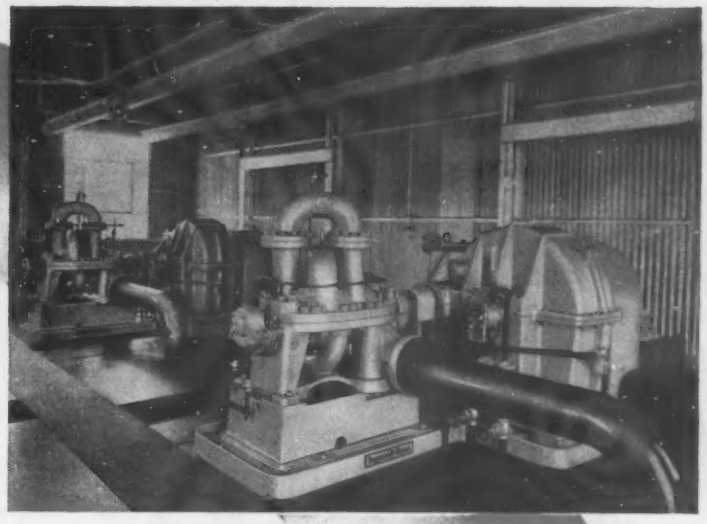
Small units, Types SU-6, 8 and 10 with gear ratios from 1.25 to 3.25 up to 1.25 to 9.



Medium units, Types SU-12, 14 and 16 with gear ratios from 1.25 to 6.5 up to 1.25 to 12.

Large units, Types SU-18, 21, 24 and 30 with gear ratios from 1.25 to 9 up to 1.25 to 12; and from 2 to 8 up to 2 to 12.

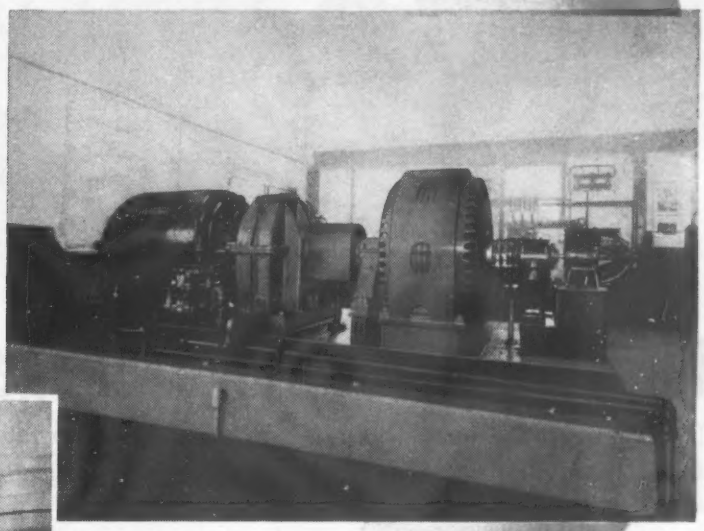
TO DO 3 IMPORTANT HIGH-SPEED JOBS



PIPELINE PUMPING

PROBLEM: to increase speed of 300 hp Diesel engine from 200 rpm to 3100 rpm required to drive centrifugal pumps in a pipeline running station.

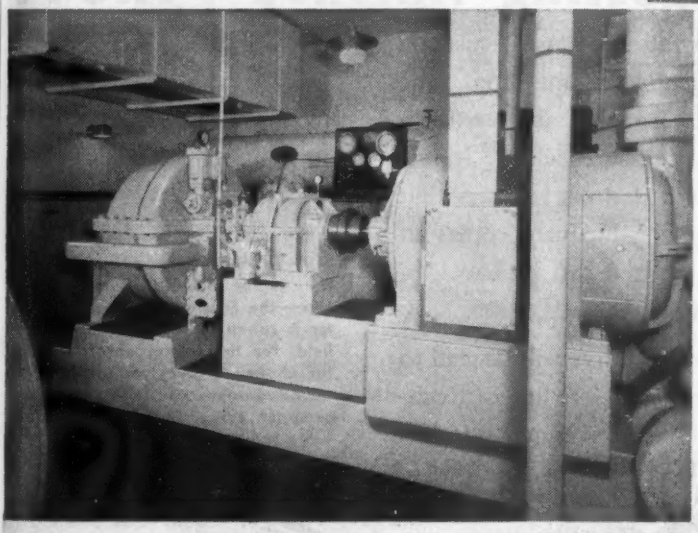
ANSWER: a Westinghouse high-speed gear unit, Type SU-24-12, provides correct speed for each unit with minimum size and weight.



BLOWERS

PROBLEM: to increase speed of 1500 hp synchronous motor, from 1200 rpm to 4700 rpm, to operate a turbo-blower in a large nickel plant.

ANSWER: a Westinghouse high-speed gear unit, Type SU-21-10 provides required speed without greatly affecting over-all size of equipment.



AIR CONDITIONING

PROBLEM: to increase speed of 350 hp electric motor from 1770 rpm to 6000 rpm to drive a centrifugal compressor for an air conditioning installation in a commercial building, where floor space was limited.

ANSWER: a Westinghouse high-speed gear unit, Type SU-8-10, compact in size, was used to provide higher speed efficiency.

Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

HIGH SPEED GEARS

Who's got the edge on getting finished FIRST?

That's easy. The man who has no loose sheets — no carbon fuss to deal with. The man whose forms are all set for writing, and who by a simple twist of the wrist will complete his transaction. Here's convenience that means efficiency — UARCO Register convenience.

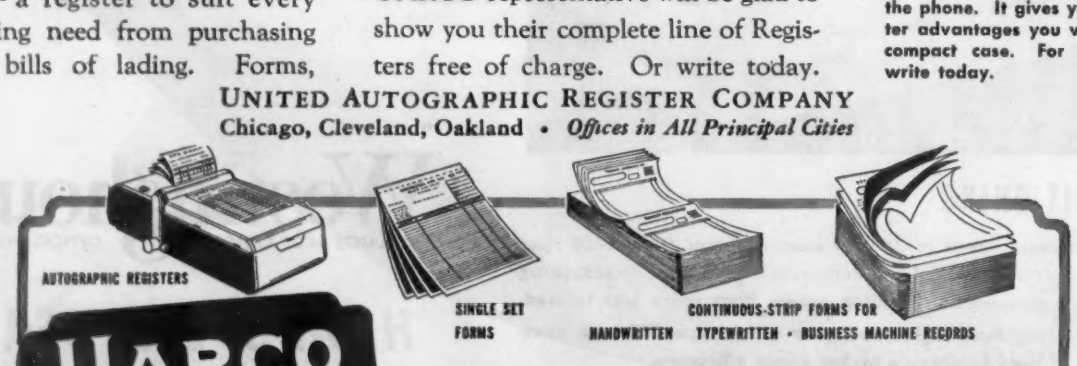
UARCO has a complete line of registers — a register to suit every record-writing need from purchasing orders to bills of lading. Forms, enough for a full day's use — usually more — are loaded at one time. The firm writing base plus an ever-fresh roll of carbon assures clean, legible copies. Also, if desired, registers that automatically file duplicate copies of every record written can be had.

Check UARCO's story today. A UARCO representative will be glad to show you their complete line of Registers free of charge. Or write today.

For Instance

Here is one of UARCO's many Registers—the Featherweight. This register is suited for order writing in the field, for the taking of orders over the phone. It gives you all the register advantages you want in a small, compact case. For further details, write today.

UNITED AUTOGRAPHIC REGISTER COMPANY
Chicago, Cleveland, Oakland • *Offices in All Principal Cities*



Jet-propelled P-80 "Shooting Star" (U. S. Army Air Forces Photo)

Bullet with Wings

It's an old idea that gave bullet-like speed and climbing power to the jet-propelled airplane.

As a motivating force, the basic principle of jet propulsion dates back hundreds of years—but it took modern skill and ingenuity—it took the finest of materials—to produce a practical jet engine.

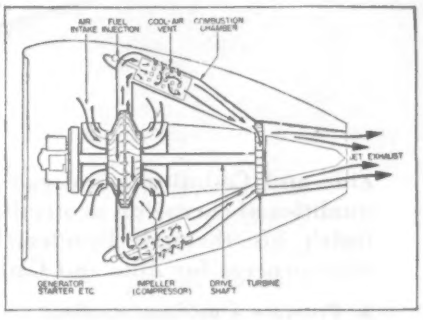
Important among these materials are Republic Electric Furnace Steels, including Enduro Stainless Steel. These alloys permit the use of temperatures which would warp or oxidize less resistant materials. They are used, also, to insure safety in the shaft connecting the impeller and turbine.

Thus, Republic Electric Furnace Steels have helped make possible another important development—just as they can be employed to improve quality, increase salability and reduce manufacturing cost of YOUR present and prospective products.

Because they are "targeted" by the close control possible only in electric furnace melting, these steels hit narrow specification marks *every time.* Because they are as CLEAN and SOUND as steel can be made, they insure against hidden inclusions. And because they are *consistently* UNIFORM in physical, chemical, hardenability and performance values, they enable manufacturers to obtain full benefits from mass production methods.

Nothing is too good for your product, if it will make your product better or cut costs. That's just what Republic Electric Furnace Steels have done for others. Let us tell you what they can do for you.

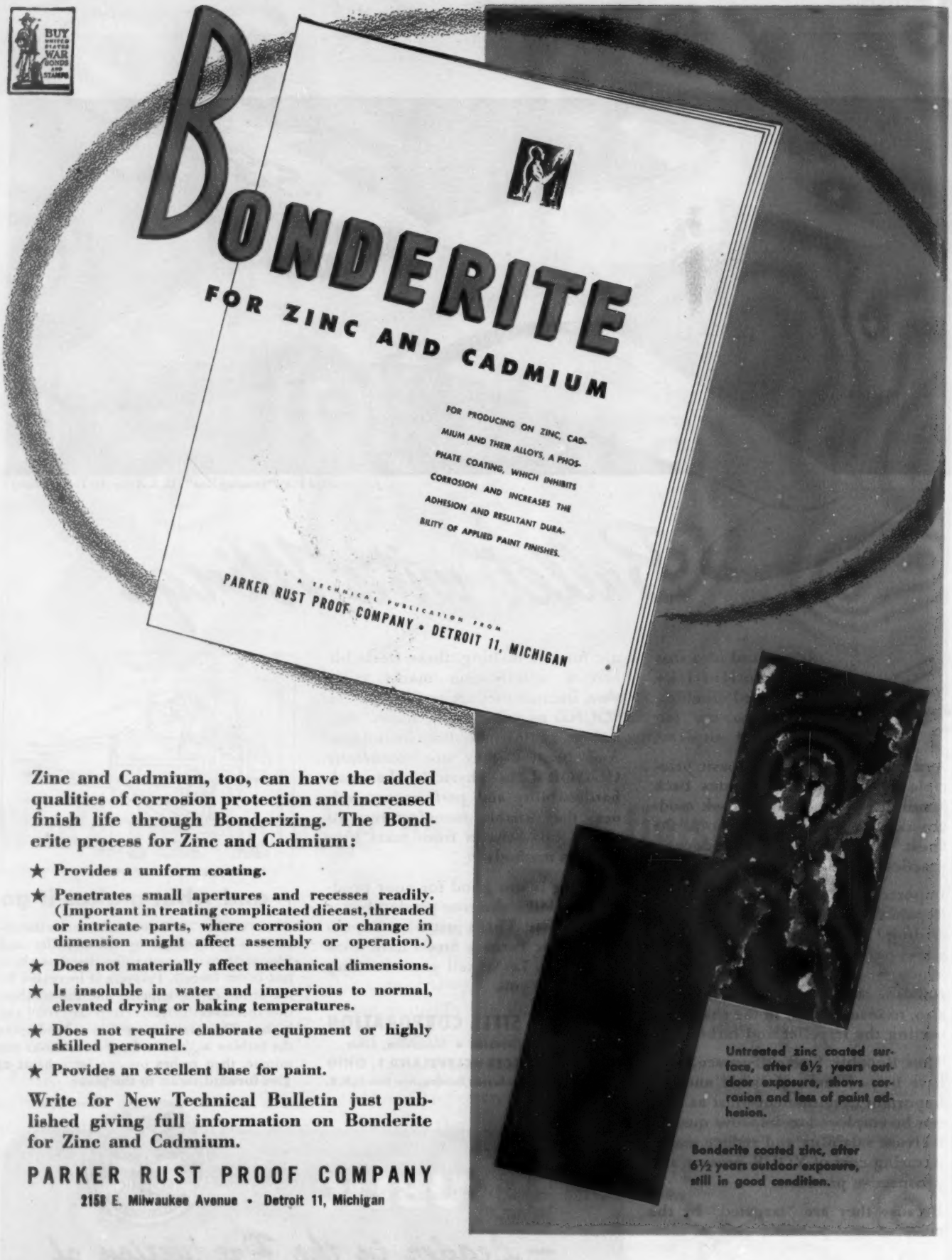
REPUBLIC STEEL CORPORATION
Alloy Steel Division • Massillon, Ohio
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N.Y.



—and what makes it go

Air, as cold as 75° below zero, enters the engine, is compressed by the impeller and whipped into the combustion chamber where fuel burns fiercely. Pressure is increased by the action of the impeller and the combustion increases the temperature to 1500° and higher. The terrific blast thus created spins the turbine at thousands of revolutions per minute, then rushes out the jet exhaust to give forward thrust to the plane.

REPUBLIC
—Leader in the Production of
ELECTRIC FURNACE STEELS
"QUALITY" steels . . . alloy . . . stainless


BUY UNITED STATES WAR BONDS AND STAMPS
BONDERITE
FOR ZINC AND CADMIUM
FOR PRODUCING ON ZINC, CADMIUM AND THEIR ALLOYS, A PHOSPHATE COATING, WHICH INHIBITS CORROSION AND INCREASES THE ADHESION AND RESULTANT DURABILITY OF APPLIED PAINT FINISHES.
A TECHNICAL PUBLICATION FROM
PARKER RUST PROOF COMPANY • DETROIT 11, MICHIGAN

Zinc and Cadmium, too, can have the added qualities of corrosion protection and increased finish life through Bonderizing. The Bonderite process for Zinc and Cadmium:

- ★ **Provides a uniform coating.**
- ★ **Penetrates small apertures and recesses readily. (Important in treating complicated diecast, threaded or intricate parts, where corrosion or change in dimension might affect assembly or operation.)**
- ★ **Does not materially affect mechanical dimensions.**
- ★ **Is insoluble in water and impervious to normal, elevated drying or baking temperatures.**
- ★ **Does not require elaborate equipment or highly skilled personnel.**
- ★ **Provides an excellent base for paint.**

Write for New Technical Bulletin just published giving full information on Bonderite for Zinc and Cadmium.

PARKER RUST PROOF COMPANY
2158 E. Milwaukee Avenue • Detroit 11, Michigan

Untreated zinc coated surface, after 6½ years outdoor exposure, shows corrosion and loss of paint adhesion.

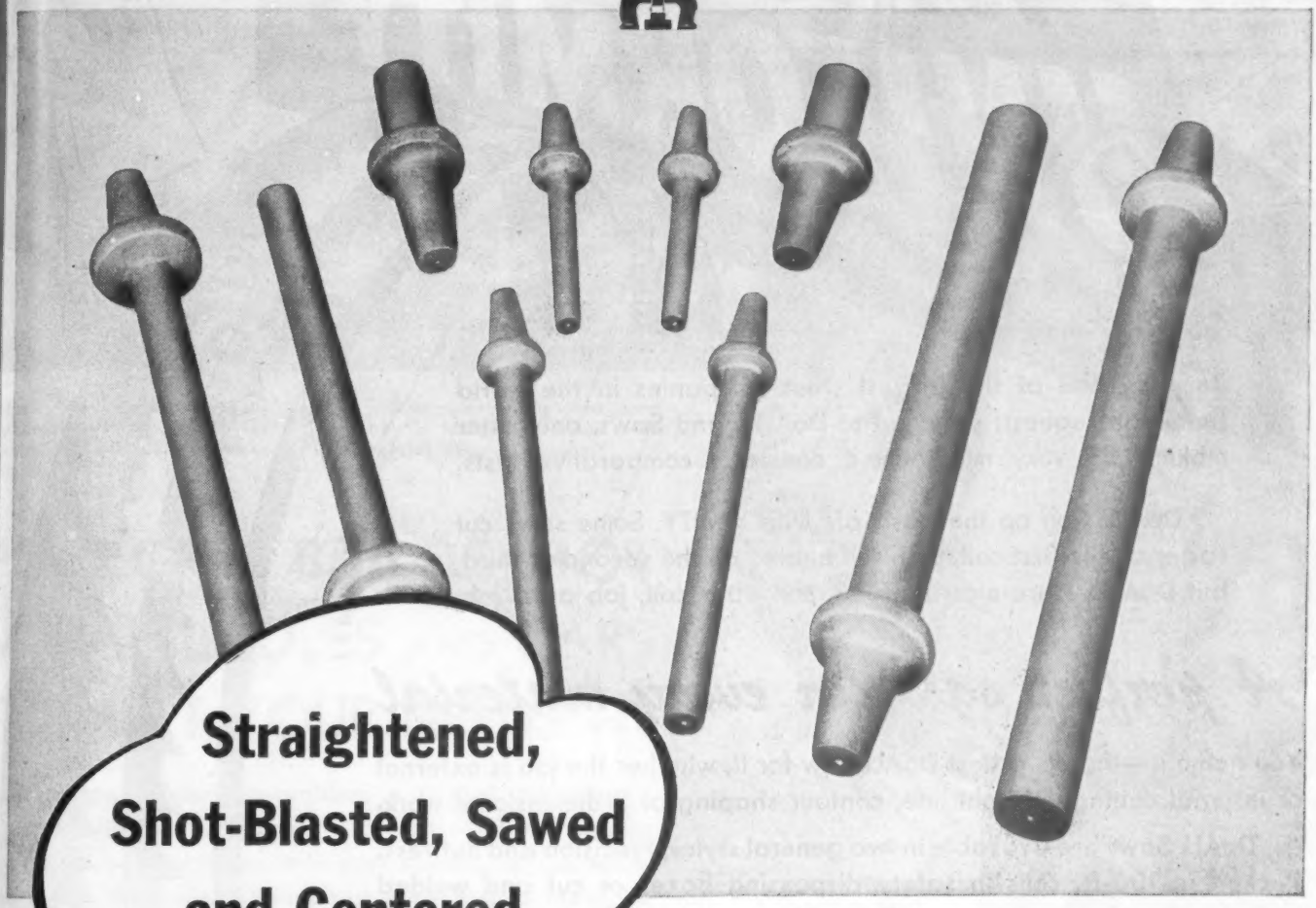
Bonderite coated zinc, after 6½ years outdoor exposure, still in good condition.

BONDERIZING • PARKERIZING • PARCO LUBRIZING

HOLDS PAINT TO STEEL — INHIBITS RUST — RETARDS WEAR

PARKER PRODUCTS CONQUER RUST

JOHNSTON & JENNINGS HAMMERED FORGINGS

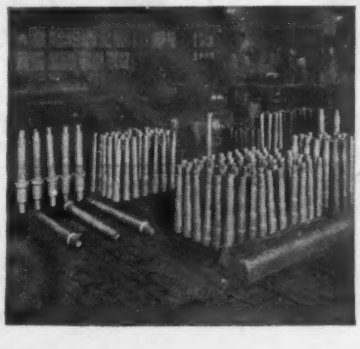


Straightened, Shot-Blasted, Sawed and Centered

● Introduced first by Johnston & Jennings, these finishing operations simplify and speed up machining in the customer's plant. They have won highest approval from the industry, and gained an outstanding preference for Johnston & Jennings forgings among shop men.

Johnston & Jennings pioneered also the manufacture of forged-to-shape arbors,—and the swaging of both spindles and arbors, using cylindrical shaped dies—thus assuring extreme concentricity and surface smoothness of the finished piece. This close identity with successive improvements in hammered forging technique has enabled us to deliver a better product, year after year,—and to serve as the principal, sometimes sole source of supply to many of the country's largest and best known concerns. Send for Bulletin No. 421,—It gives full details,—and "Check with J & J" on your next forging job.

Above:—Hot Swaging a Machine Tool Spindle in Cylindrical Shaped Dies. *Below:*—Group of J & J Milling Machine and Grinder Spindles, Forged, Sawed, Centered and Shot Blasted.



THE JOHNSTON & JENNINGS CO.

905 Addison Road • Cleveland 14, Ohio

HAMMERED FORGINGS, HOLLOW BORING AND ALLIED SERVICES

WINS ON UNIFORMITY

Recently one of the largest steel companies in the world (name on request) switched to DoALL Band Saws, only after making 29 very minute and concrete, comparative tests.

DoALL won on the basis of UNIFORMITY. Some saws cut faster on the first coil, then fell behind on the second or third, but DoALLs were most uniform, coil after coil, job after job.

A perfect saw for every material

You name it—there's a best DoALL saw for it, whether the job is external or internal cutting, straight line, contour shaping or 3-dimensional work.

DoALL Saws are available in two general styles, Precision and Buttress. Packed in 100-ft. coils in safety dispensing boxes or cut and welded to fit any band sawing or cut-off machine.

REQUIRE NO RESHARPENING

DoALL saw blades are so tough and give so much additional service that it is economical to run them until worn out and then replace with new blades.

PRECISION SAWS

Recommended for use on all ferrous metals. Come in widths from 3/32" to 1", pitches 6 to 32.

BUTTRESS SAWS

The finest for non-ferrous metals, aluminum, magnesium, plastics, laminates, ceramics, wood, etc. Widths 1/4" to 1". Pitches 2 to 6.

Write or phone for booklet illustrating and listing all DoALL Saws.

INDUSTRY'S NEW SET OF TOOLS

Contour Sawing · Band Filer · Surface Grinders · Magnetic Chucks and Selectron · Colloidal Oils · Dust Collector · SPEEDMASTER · Band Saws · Band Files · Gage Blocks with Instruments

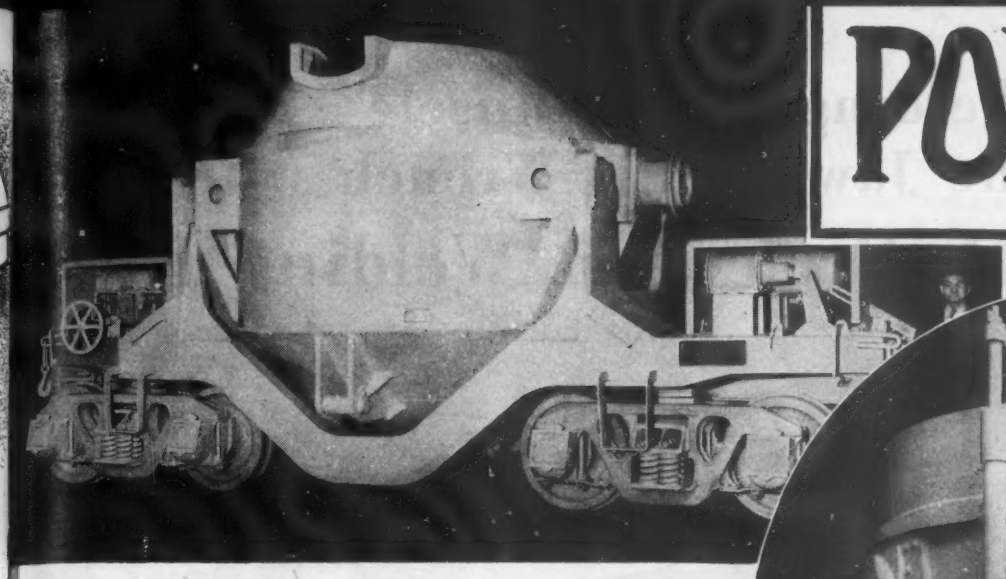
Baltimore	SA 5778	Dayton	HE 2738	Kansas City	HA 5857	Milwaukee	HO 5950	New York	MU 4-1514	Philadelphia	BAL 5850
Birmingham	3-0502	Denver	KE 7511	Los Angeles	TR 3871	Minneapolis	GL 1173	Orlando	6056	Pittsburgh	AT 3386
Boston	ASP 6669	Detroit	TE 2-3060								
Buffalo	PA 6666	El Paso	MAIN 7046								
Chicago	SEE 1166	Grand Rapids	8-0922								
Cincinnati	MAIN 3829	Hartford	6-7296								
Cleveland	EX 1177	Houston	C 6588								
Dallas	H 6610	Indianapolis	LI 8957								

The DoALL Company Des Plaines Illinois

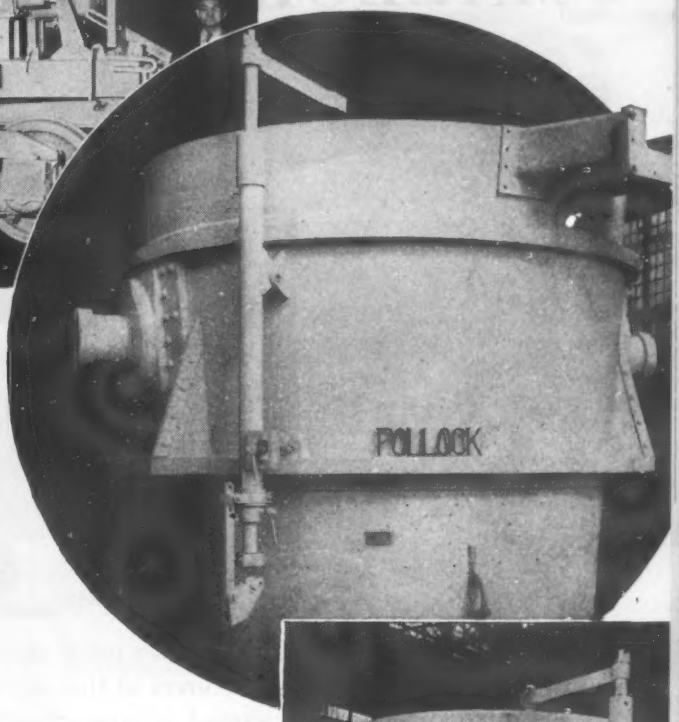
Telephone Your "DoALL" Sales and Service Store

Providence	WI 1515	Reading	7258	Rochester	MAIN 5175	Rockford	MAIN 227	St. Louis	CE 3621	St. Paul	EN 2399
Salt Lake City	3-9074	San Francisco	GA 4784	Seattle	EAST 7500	Statesville	518	Syracuse	3-7212	Toledo	GA 8309
Toronto	RA 5191	Tulsa	4-8841	Vancouver	MA 2511						

POLLOCK



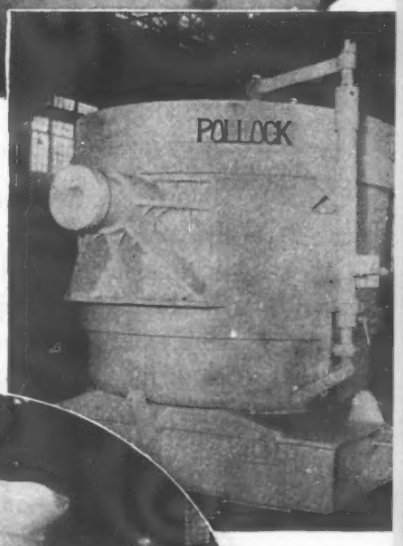
Pollock "heat retaining type" hot metal ladle and car for top pouring in the car itself, or from a crane.



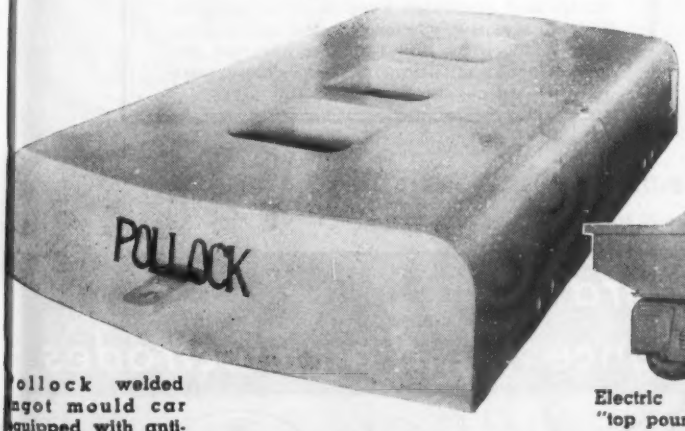
Pollock patented welded open hearth ladle, complete with special stopper rigging.

POLLOCK BUILDS HOT METAL LADLES AND CARS TO MEET YOUR NEEDS ---

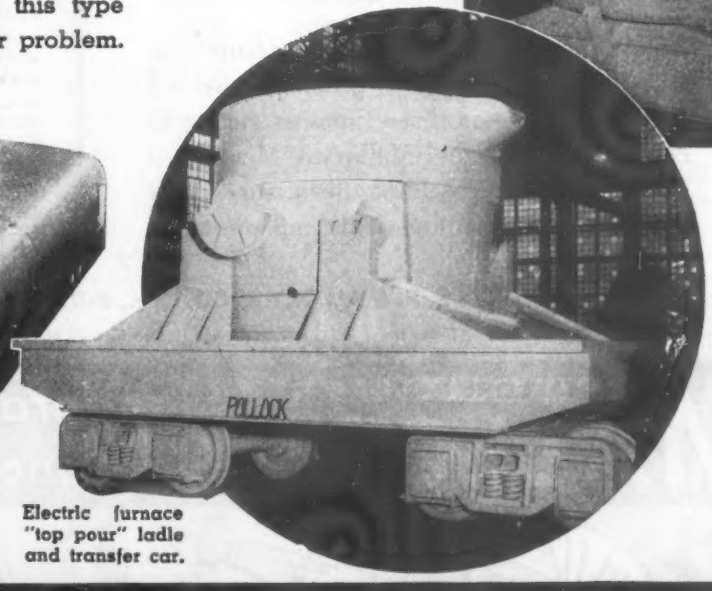
Your hot metal handling problem is studied individually by The William B. Pollock Company and the proper equipment is tailor-made to fit your special requirements. Years ago the Pollock Company were first to meet the needs of our iron and steel pioneers in the handling of hot metal; they have built more ladles and cars than any other builder, and are still foremost in the field. The Pollock Company themselves pioneered in successfully introducing welded steel construction in this type of equipment. Let Pollock help you with your problem.



Electric furnace "bottom pour" ladle, stopper rigging and transfer car.



Pollock welded ingot mould car equipped with anti-friction bearings.



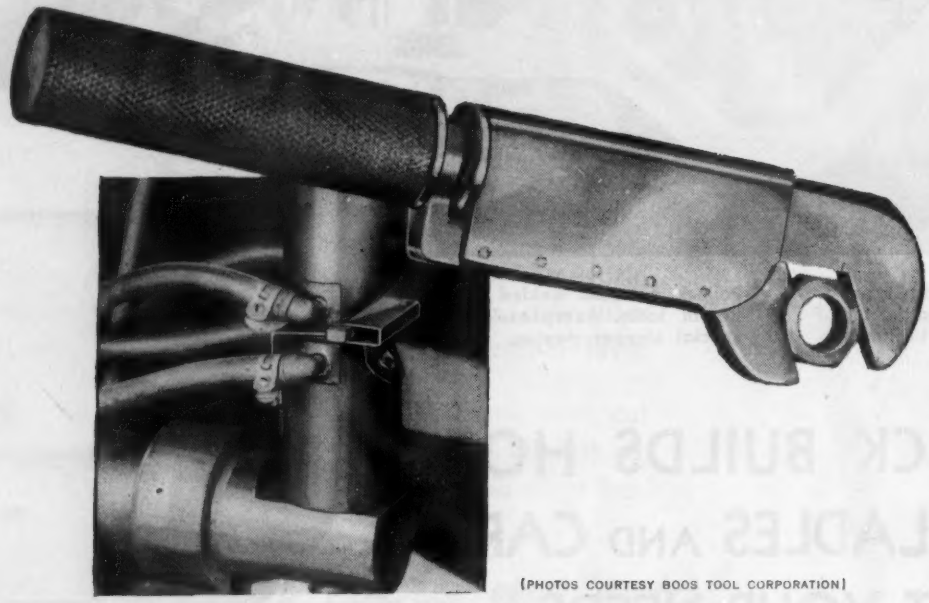
Electric furnace "top pour" ladle and transfer car.

THE WILLIAM B. *Pollock* COMPANY

YOUNGSTOWN, OHIO

BLAST FURNACE AND STEEL PLATE CONSTRUCTION *Since* 1863

Welding More "Muscle" into the Jaw of this Wrench with MALLORY Projection Welding Dies



(PHOTOS COURTESY BOOS TOOL CORPORATION)

SINCE the lower jaw bears most of the stress, the manufacturers of this adjustable angle wrench wanted to strengthen its lower jaw.

Mallory engineers quickly assisted in finding the answer. They recommended projection welding to fasten the lower jaw to the housing. Five small projections were stamped on each side of the housing, so that 10 welds would join jaw to housing in a single operation.

Result, according to the manufacturer, is that the fixed lower jaw—projection welded to the housing—is three times as strong as conventional designs! Mallory 3*Metal used for the projection welding dies assures high speed production, sound welds, and long runs.

Whatever metals you are resistance welding —ferrous or non-ferrous—by spot, seam, flash, butt or projection welding . . . Mallory electrodes can help to make your operations more efficient. Write us about your specific problems today, and ask for a free copy of the latest catalog on Mallory Resistance Welding Electrodes.

Attention—Welding Engineers

Here's a handbook you'll want . . . the improved, revised and expanded Mallory Resistance Welding Data Book (3rd Edition), containing the most complete information available on resistance welding methods, machines and materials. Free to those using resistance welding, when requested on company letterhead. Price to students, libraries and educational institutions: $2.50 per copy, postpaid. Board covers, 8½ x 11", 160 pages.

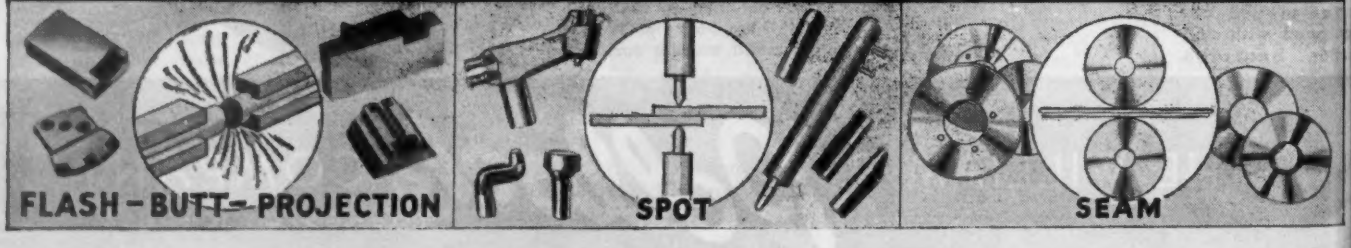
P. R. MALLORY & CO., Inc., INDIANAPOLIS 6, INDIANA

In the United Kingdom, Made and Sold by Mallory Metallurgical Products, Ltd., London.

*Reg. U.S. Pat. Off.

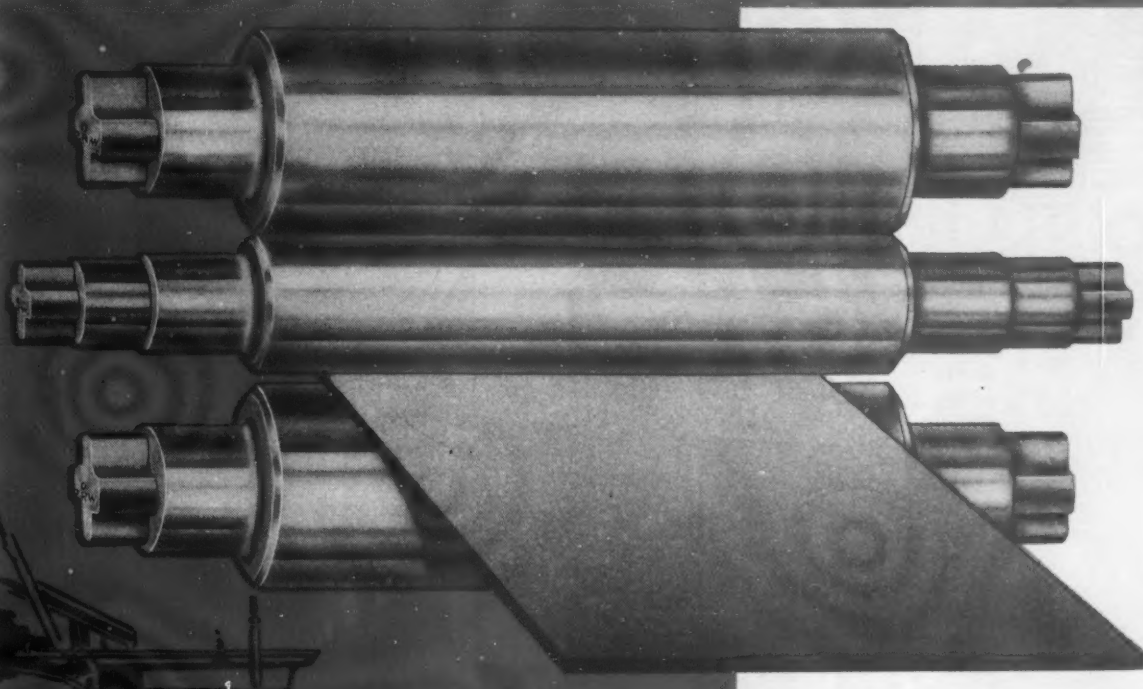
P.R. MALLORY & CO. Inc

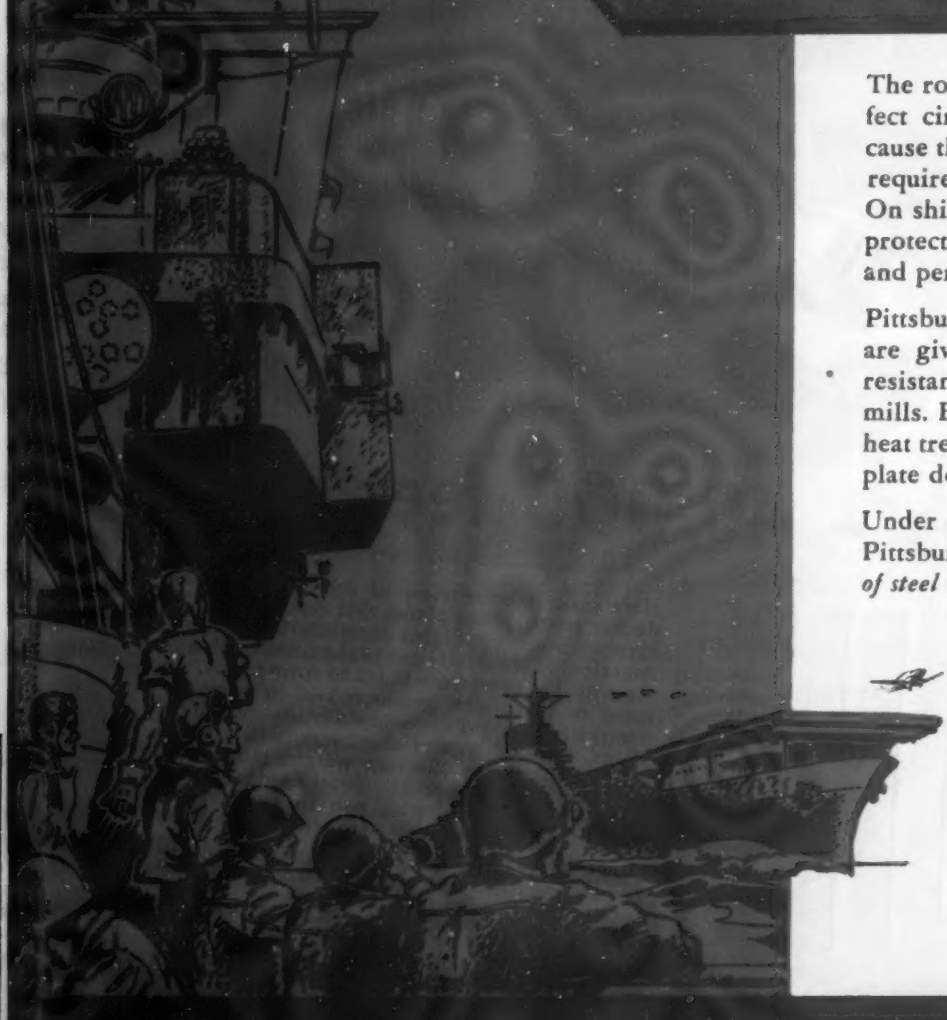
MALLORY Standard Resistance Welding Electrodes



PLATE

ROLLING TECHNIQUE





The rolling of plate is like drawing a perfect circle free-hand . . . it looks easy because the shape is simple. But plate rolling requires the highest skill *and perfect rolls.* On ships and tanks and planes, steel plate protects vital control points, ammunition and personnel.

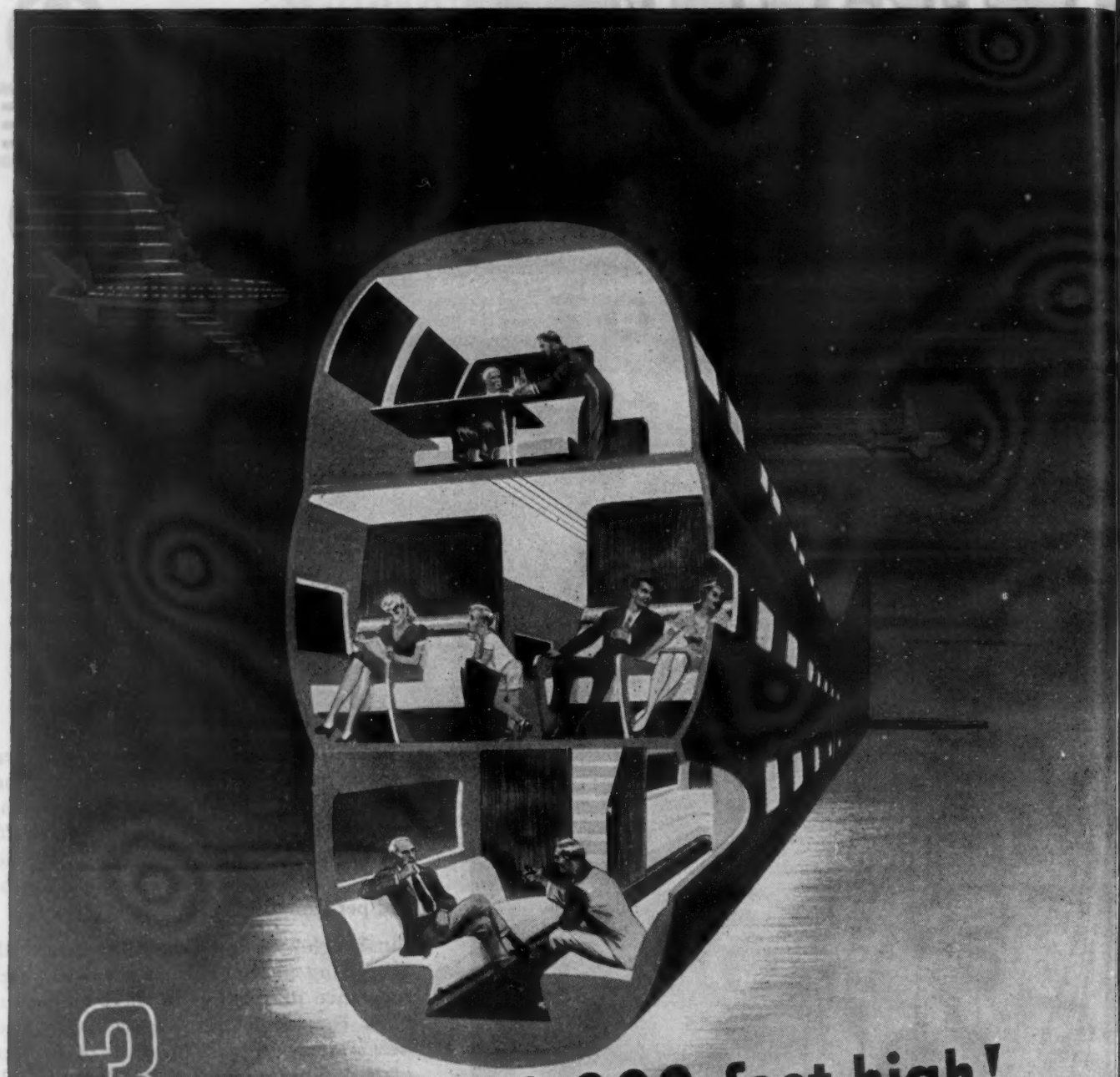
Pittsburgh 25 Grain Type Alloy Iron Rolls are giving excellent tonnages with high resistance to spalling in three-high plate mills. For floor plates, a special alloy steel heat treated roll is used because of the floor plate design that must be cut into the roll.

Under exacting plate mill requirements, Pittsburgh Rolls produce *at less cost per ton of steel rolled.*

PITTSBURGH ROLLS
Division of Blaw-Knox Company
PITTSBURGH, PA.

75 YEARS EXPERIENCE
1945

PITTSBURGH ROLLS

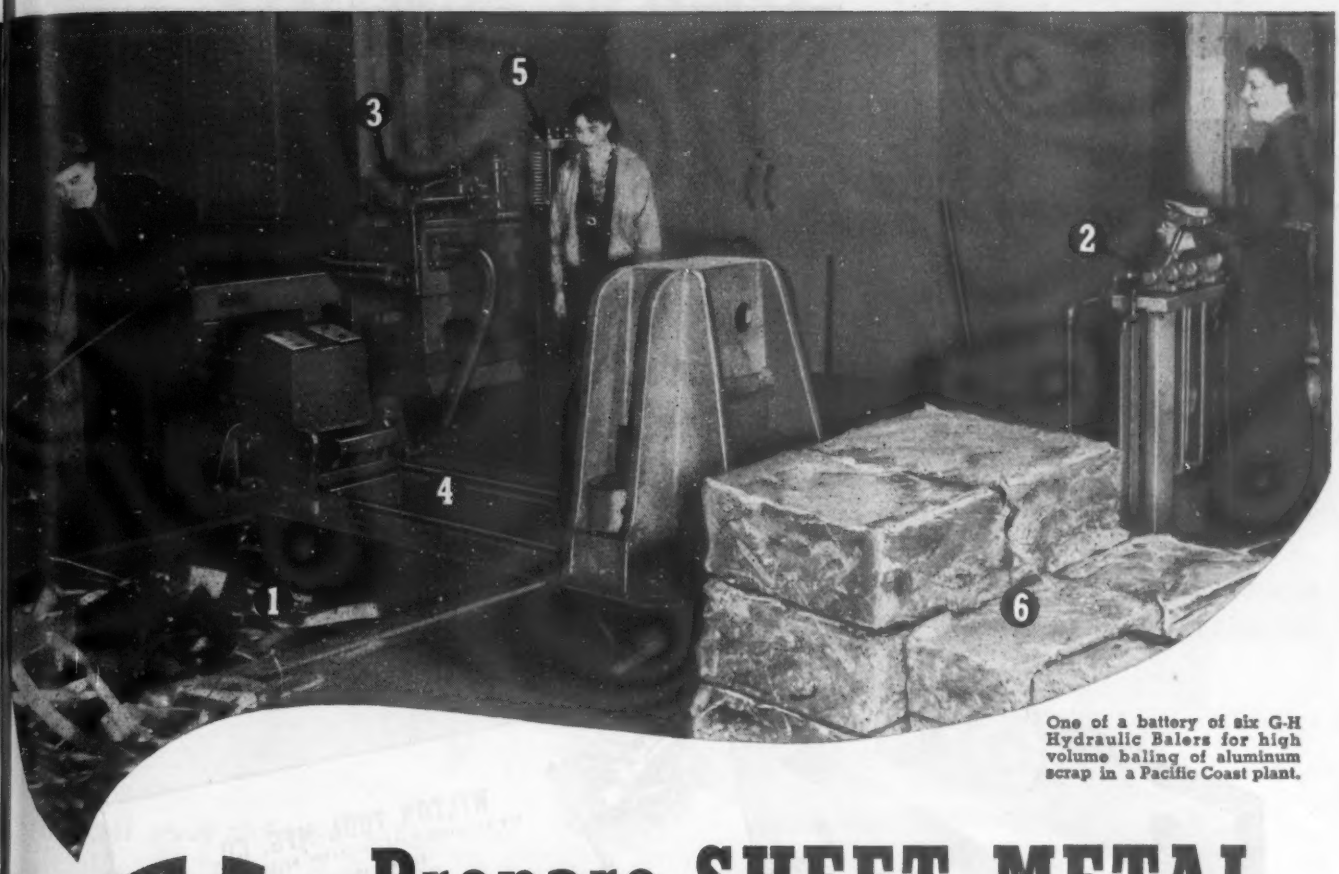


3 stories – 40,000 feet high!

BOHN

Here's an interior view of one of the three-decker stratosphere planes that one day may be making non-stop flights between Europe and America. This is only one of the amazing things the world of tomorrow holds in store for us. In many of these new products and in improvements of many products in daily use—the light alloys, magnesium and aluminum, will play an important part in effecting weight reductions, reducing operating costs. Bohn Engineers will be glad to consult with you in fitting these versatile light alloys into your production plans.

BOHN ALUMINUM AND BRASS CORPORATION
GENERAL OFFICES, LAFAYETTE BLDG. • DETROIT 26, MICHIGAN
Designers and Fabricators
ALUMINUM • MAGNESIUM • BRASS • AIRCRAFT-TYPE BEARINGS



One of a battery of six G-H Hydraulic Balers for high volume baling of aluminum scrap in a Pacific Coast plant.

Prepare SHEET METAL SCRAP properly . . . .

Bale it the G-H Way!

KEY TO ILLUSTRATION

1. Loading Hopper into which loose scrap is gathered.
2. Easily operated control valves manipulated by woman employee.
3. Poppet type hydraulic operating valves provide dependable distribution of power.
4. Baling chamber where loose scrap is converted to dense mill size bales.
5. Shock Alleviator protects hydraulic system.
6. Finished Bales, loaded on skids.

You are at a disadvantage if you are not equipped to convert Sheet Metal Scrap . . . ferrous or non-ferrous . . . into usable form rapidly, at low cost. A G-H Hydraulic Baling Press of proper size and capacity . . . engineered to your needs . . . is the final, vital step in proper scrap preparation.

Galland-Henning builds balers to produce dense, compact bales for every charging requirement . . . from electric furnaces and foundries to giant open hearth steel mills.

For Experienced Counsel on Your Baling Problems, write

GALLAND-HENNING MFG. CO., 2747 S. 31st St., Milwaukee 7, Wis.

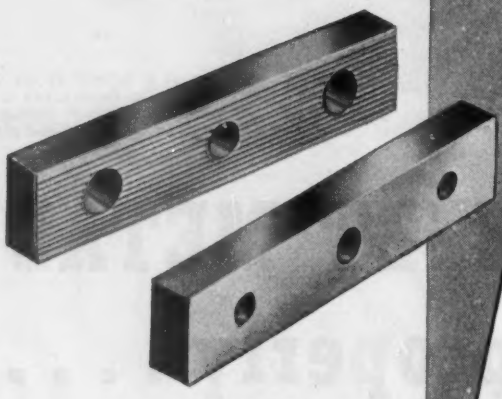
GALLAND-HENNING

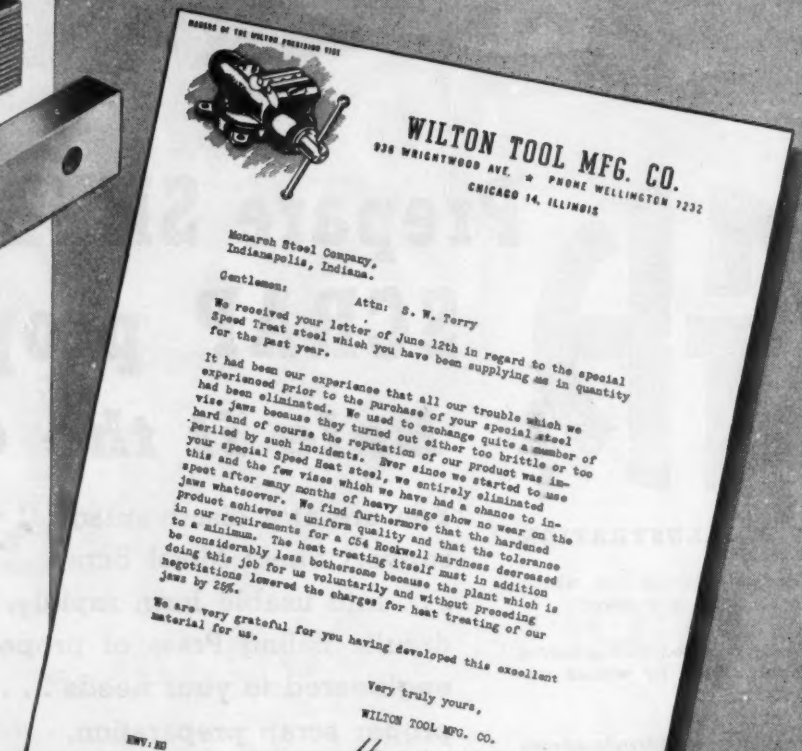
SCRAP METAL BALING PRESSES

A 4879-1PA

Eliminate Your Troubles Too!

Wilton Tool Mfg. Co. of Chicago, Illinois, reports ALL previous trouble in making Vise Jaws eliminated by use of Speed Treat Steel.





WILTON TOOL MFG. CO.
936 WRIGHTWOOD AVE. ☆ PHONE WELLINGTON 7232
CHICAGO 14, ILLINOIS

Monarch Steel Company,
Indianapolis, Indiana.

Gentlemen: Attn: S. W. Terry

We received your letter of June 12th in regard to the special Speed Treat steel which you have been supplying us in quantity for the past year.

It had been our experience that all our trouble which we experienced prior to the purchase of your special steel had been eliminated. We used to exchange quite a number of vise jaws because they turned out either too brittle or too hard and of course the reputation of our product was imperiled by such incidents. Ever since we started to use your special Speed Heat steel, we entirely eliminated this and the few vises which we have had a chance to inspect after many months of heavy usage show no wear on the jaws whatsoever. We find furthermore that the tolerance product achieves a uniform quality and that the hardened in our requirements for a C54 Rockwell hardness decreased to a minimum. The heat treating itself must in addition be considerably less bothersome because the plant which is doing this job for us voluntarily and without preceding negotiations lowered the charges for heat treating of our Jaws by 25%.

We are very grateful for you having developed this excellent material for us.

Very truly yours,
WILTON TOOL MFG. CO.
HUGH W. VOGL

HWV:HG

The Vise Jaws and the Facts!

Previous jaws were too hard or brittle, causing serious complaints from their customers. Jaws made from Speed Treat X1545 Steel completely eliminated this and show no wear after months of use.

Heat treating cost immediately dropped 25%—a major production cost saving.

Write for SPEED CASE and SPEED TREAT CATALOG
Our Metallurgists are at your service

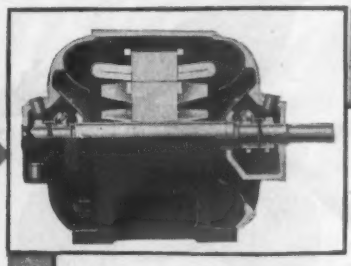
Licensee for Eastern States
THE FITZSIMONS COMPANY
YOUNGSTOWN, OHIO

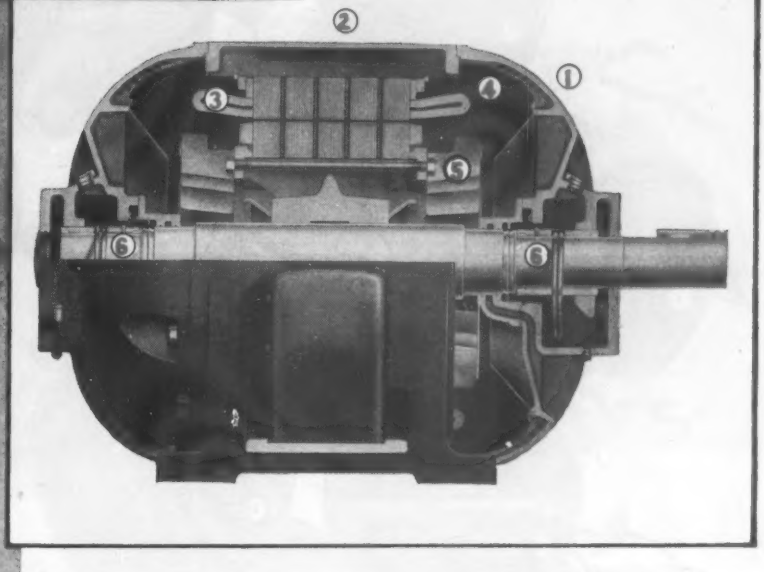
Licensor
MONARCH STEEL COMPANY
HAMMOND · INDIANAPOLIS · CHICAGO
PECKOVER'S LTD., Toronto, Canadian Distributor

SAME STRONG POINTS OF CONSTRUCTION

from 1 hp

to 2000 hp





Now all your drives — large and small — can have standard G-E Tri-Clad induction motors with the famous protective features that guard against PHYSICAL DAMAGE, ELECTRICAL BREAKDOWN, OPERATING WEAR AND TEAR.

Tri-Clad, in its wide range of types and sizes (recently increased to 2000 hp), is G.E.'s most widely used (integral-hp) motor. For complete details on ratings, characteristics, and dimensions, write for Bulletin GEA-3580. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

HERE'S TODAY'S WIDER RANGE OF STANDARD SIZES	
Tri-Clad Type K (Low starting current, normal starting torque)	1 hp to 2000 hp at 1800 rpm
Tri-Clad Type KG (High starting torque, low starting current)	5 hp to 200 hp at 1800 rpm
Tri-Clad Type KR (High starting torque, high slip)	Available to 100 hp in speeds required for high-slip flywheel drive (punch press, etc.)

1. Cast-iron frame and rigid, cast-iron end shields protect the motor from external blows and accidental abuse.
2. Completely enclosed upper portion of frame guards against entry of falling objects and dripping liquids; keeps chips and the like from vital motor parts.
3. Windings of Formex* wire—one of the toughest magnet wires yet developed—resist heat aging, heat shock, and abrasion.
4. End windings are coated with Glyptal* varnish, providing a tough, hard finish that withstands moisture, oil, and abrasion.
5. Low-velocity, double-end ventilating system keeps the motor running cool and prolongs insulation life. One-piece, cast-aluminum rotor (used on all but the largest sizes), with integrally cast fans, is practically indestructible.
6. Bearings have extra capacity to take heavy shaft loadings from any direction. Lubrication is convenient, its effectiveness well proved.

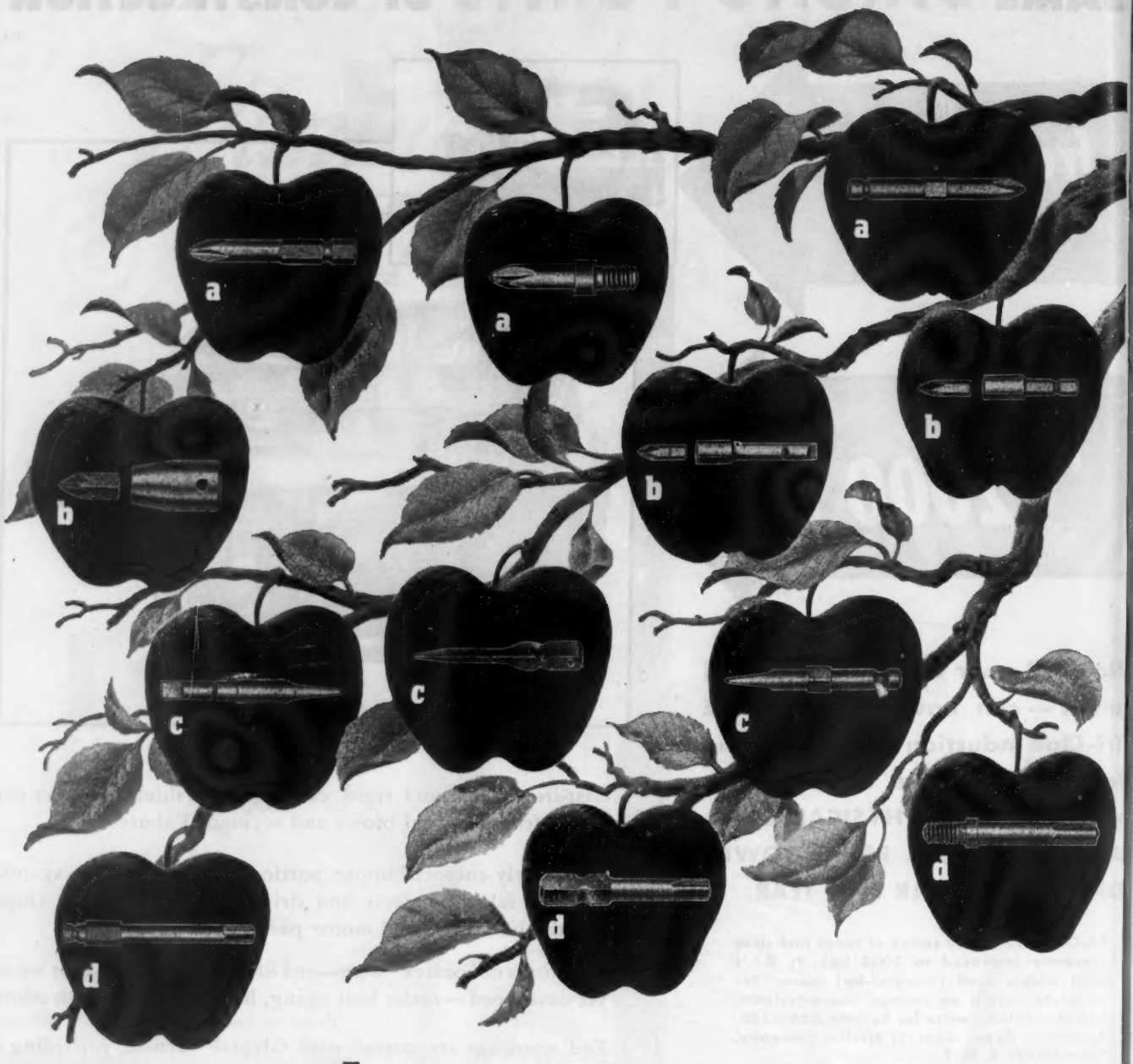
*Trade-mark reg. U. S. Pat. Off.

TRI-CLAD MOTORS

Buy all the BONDS you can — *and keep all you buy*

GENERAL ELECTRIC

Take your pick of Apex tools for driving screws!



a. Power Bits and Hand Drivers for Phillips Recessed Head Screws (Catalog No. 15)

b. Insert Type Power Bits and Hand Drivers for Phillips Recessed Head Screws (Catalog No. 102)

c. Power Bits for Slotted Head Screws (Catalog No. 16)

d. Power Bits and Hand Drivers for Clutch Head Screws (Catalog No. 17)

There's always a bumper crop on the Apex family tree: bits for practically every make of air or electric driver, for every size and style of screw. With Apex-Phillips bits you can take your choice of the solid type (send 'em back and we recondition them at a fraction of the original price) or the insert type (throw away the worn out tips and insert new ones). *Pick out* the Apex bits you need, *pick up* speed in your assembly departments, and *bear down* on tool costs.

APEX

THE APEX MACHINE & TOOL COMPANY • DAYTON 2, OHIO

8 Balanced Design Features

OF RELIANCE SERIES C MOTORS

1. **Protecting enclosures** keep out dirt, chips, oil, excess moisture.
2. **Steel stators for strength.**
3. **Thirteen-step winding treatment,** for maximum stator protection.
4. **Pressure cast aluminum rotors** provide trouble-free windings.
5. **Heavy shafts,** liberally designed for added strength.
6. **Improved bearing lubrication** affords *real* protection to bearings and windings.
7. **Optional lead outlet arrangement** permits machine mounting with elimination of conduit box.
8. **Flange and face type brackets** offer alternative methods of machine application.

● Reliance Series C Motors are designed and precision built *to make it absolutely impossible to grease them wrong.* On the vast majority of applications, these factory lubricated motors continue to operate *for years* with no additional lubrication whatsoever. In cases where unusual conditions make occasional attention necessary—or if it is your practice to lubricate at regular intervals—undergreasing or overgreasing make no difference. Write for Bulletin C-118 which tells the whole story—and specify Reliance Series C Motors to forget lubrication worries.

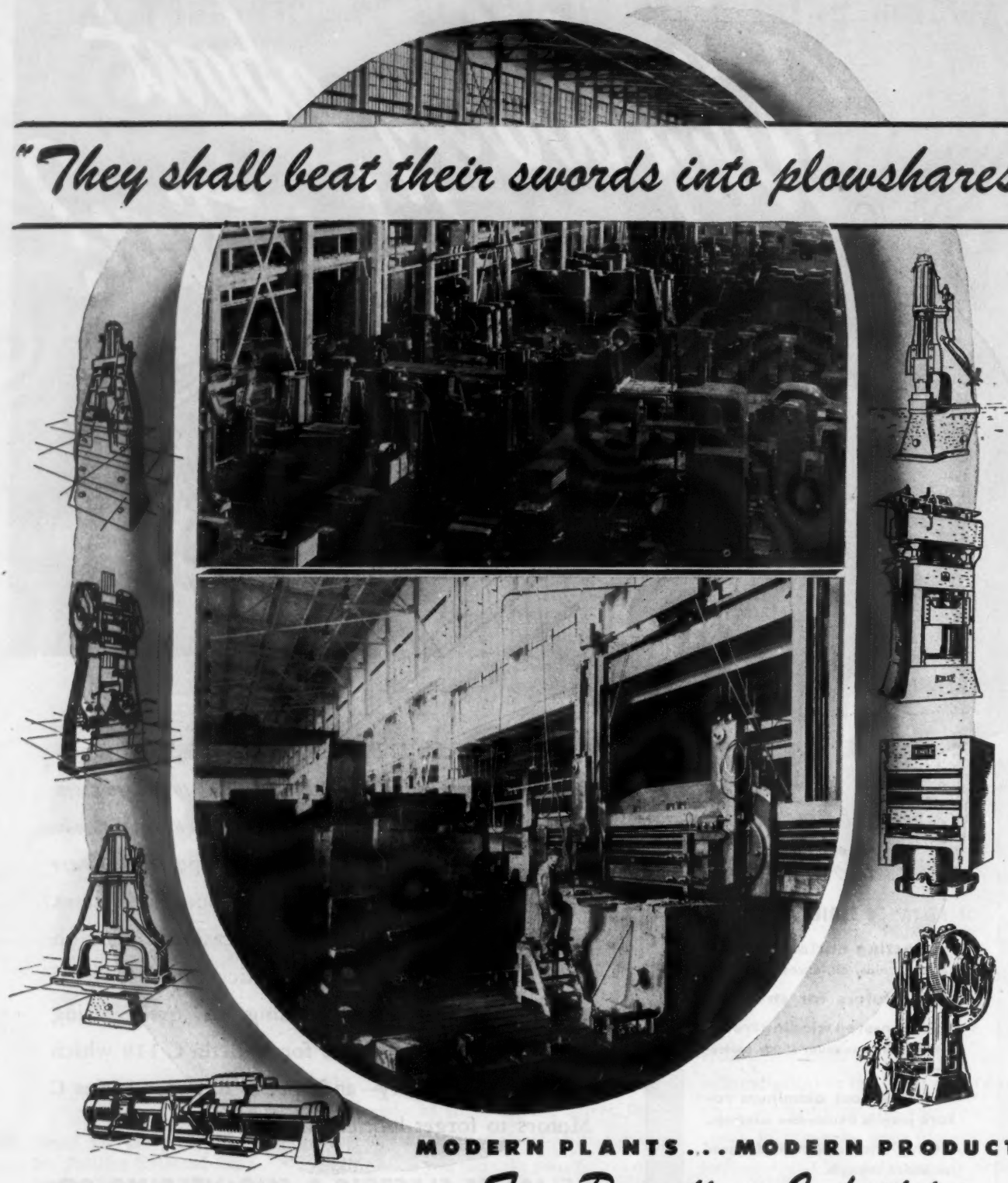
RELIANCE ELECTRIC & ENGINEERING CO.

1081 Ivanhoe Road Cleveland 10, Ohio

Birmingham • Boston • Buffalo • Chicago • Cincinnati • Detroit • Greenville • Houston • Kalamazoo
Knoxville • Los Angeles • Minneapolis • New Orleans • New York • Philadelphia • Pittsburgh
Portland, Ore. • Rockford, Ill. • St. Louis • San Francisco • Seattle • Syracuse • Washington, D.C.

RELIANCE A·C D·C MOTORS

"They shall beat their swords into plowshares"



MODERN PLANTS... MODERN PRODUCTS

For Peacetime Industries

On its 50th anniversary, Erie Foundry Company sums up a half century of Progress . . . and recognizes an even greater challenge at the opening of a new era. Having served in two World Wars with meritorious citations for achievement, Erie Foundry Company again picks up its industrial production with broader experience and finer equipment to produce steam and board drop hammers, forging hammers, trimming presses, hydraulic presses and extruding presses, plus special machining work which you may find of value.

ERIE FOUNDRY COMPANY ERIE, PENNSYLVANIA

ERIE

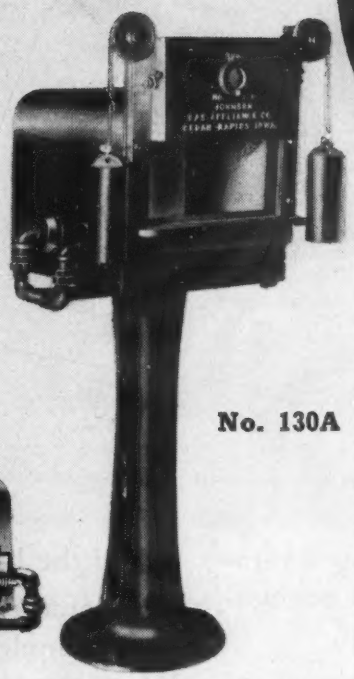
ERIE BUILDS HAMMERS

No. 130

Quick Acting Johnson Furnaces

SPEED UP Heat-Treating Operations at LOW COST

- Harden ANY steels, tools, dies or small metal parts quickly and economically



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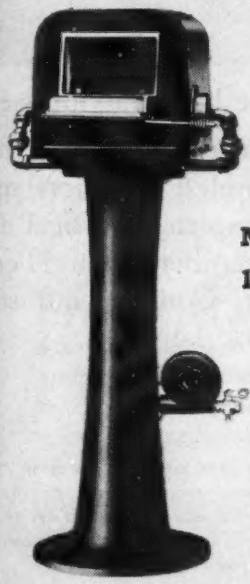

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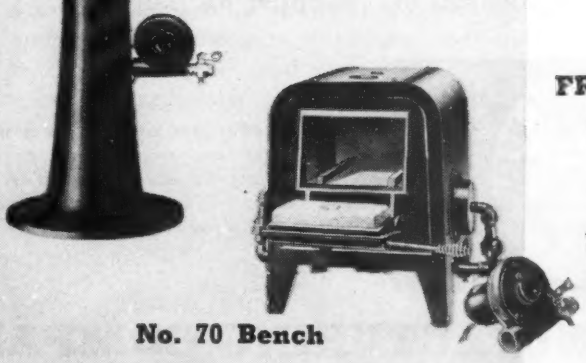


No. 70 Bench

Turn on the Heat and you're Ready for *Action*

Quick Acting JOHNSON Furnaces bring a new standard of efficiency to toolroom and shop. Compact, powerful, and remarkably economical to operate they reach desired temperatures FAST to pay off in LOWER HEAT-TREATING COSTS. Designed primarily for high-speed steels . . . equally efficient for hardening ANY steel tools, dies, punches, or small metal parts. Get more heat for your dollar. Write today for complete specifications.

No 130 HI SPEED FURNACE. Consistently develops 2300° F in 25 Minutes Firebox 5½ x 13 x 13½.
$248 00 F.O.B. Factory

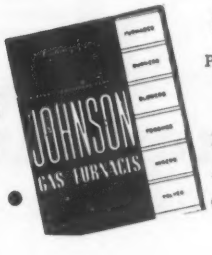
No 130A HI SPEED FURNACE. Features counterbalanced door opening upwards Firebox 7¾ x 13 x 16½. With 4 or 6 burners for temperatures 1400 — 2000° F, 1800 — 2400° F.
4-Burner Unit shown. . . . . $295.00 F.O.B. Factory
6-Burner Unit . . . . . $325.00 F.O.B. Factory

No 120 HI SPEED FURNACE. Reaches 1500° F in 5 Minutes! 2300° F. in 30 Minutes Firebox 5 x 7¾ x 13½.
$129.50 F.O.B. Factory

No. 70 HI-SPEED BENCH FURNACE. Delivers 2250° F in 30 Minutes from a Cold Start! Firebox 5 x 7¾ x 9.
$89.50 F.O.B. Factory

FREE CATALOG

Describes JOHNSON Furnaces for pot-hardening, melting, annealing and heat-treating. Covers complete line of industrial gas burners for every purpose. Write for copy.



JOHNSON GAS APPLIANCE CO.
573 E. Avenue N. W., Cedar Rapids, Iowa

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Please send me full information on JOHNSON Quick-Acting Furnaces . . . . . ☐

Complete JOHNSON Catalog . . . . . ☐

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Are you informed about the *new* Titanium Steel for Vitreous Enameling

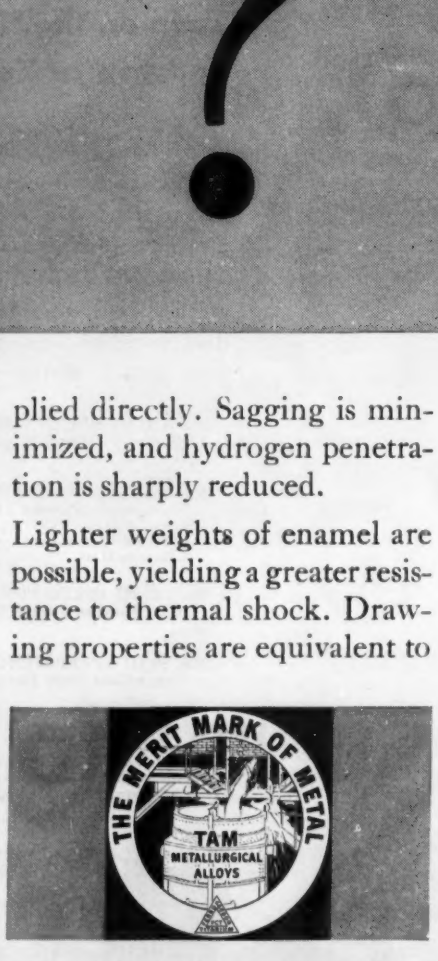
?

LABORATORY-TESTED and plant-proved are the advantages of this *new* Titanium steel to manufacturers of vitreous enamel products, when recommended practice is followed in steel making, pickling and enameling.

By removing source of reboil in the stock, large cost reductions are possible. Ground coat can be eliminated and conventional cover coats may be applied directly. Sagging is minimized, and hydrogen penetration is sharply reduced.

Lighter weights of enamel are possible, yielding a greater resistance to thermal shock. Drawing properties are equivalent to that of the best drawing steel.

Manufacturers of both steel and enameled products may obtain complete technical data from a member of our Technical Staff. Consult your steel supplier for deliveries.



Pending patent applications on the new enameling process and product made thereby are owned jointly by Inland Steel Company and The Titanium Alloy Manufacturing Company under Trust Agreement.

THE TITANIUM ALLOY MANUFACTURING COMPANY

Executive Offices: 111 BROADWAY, NEW YORK, N. Y. *General Offices and Works:* NIAGARA FALLS, N. Y.

IT'S NEW
WEIGHS ONLY 4.4 POUNDS
IT'S ONLY 3⅞ INCHES LONG EXCLUDING DRIVE SHAFT
BUT IT DELIVERS PRESSURES UP TO 1500 P.S.I.
CAPACITIES: 3.5 g.p.m. at 1,500 r.p.m. or 7 g.p.m. at 3,000 r.p.m. Triangular mounting (shown), SAE magneto mounting flange or special mountings.

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It's tiny, but packed with power . . . this NEW General Purpose Hydraulic Pump by PESCO. It fits the palm of your hand with ease . . . yet it develops pressures up to 1,500 p.s.i. Superior design gives this pump unusually high volumetric efficiencies—95% and better at 3,000 r.p.m. at 1,500 p.s.i. And, small as it is, it features *Pressure Loading*, the exclusive PESCO development that *automatically* maintains minimum clearance between pump gears and gear housing, making possible continuous high operating efficiencies over a wide range of temperature variations and speeds.

The possible uses of this NEW PESCO General Purpose Hydraulic Pump cover numerous industrial applications. Its sturdy, yet simple construction assures a long life of trouble-free operation. Other models available for pressures up to 3,000 p.s.i. Write for Bulletin No. 101 and other descriptive literature on hydraulic pumps. PESCO Products Co. (division Borg-Warner), 11610 Euclid Avenue, Cleveland 6, Ohio.

In Precision Hydraulics, Fuel Pumps, Air Pumps, Related Accessories . . .

PERFORMANCE POINTS TO Pesco FIRST

Get the right S/V Sova-Kote to meet your individual needs!

LOOK AROUND your plant! You may be surprised to find many spots where you can effect important savings by stopping rust during storage.

For instance, you may have a number of assembled machines temporarily idle due to shifts in production schedules. Auxiliary engines, accessories, tools, dies, jigs and fixtures may be set aside, awaiting further use. Or some of your finished metal parts may be in storage, awaiting assembly or shipment.

Where rust is a danger you can be certain of the answer in the complete S/V Sova-Kote line. For this line now includes 11 proved rust prevention products, designed to meet every current need of modern industry.

Call your Socony-Vacuum Representative. Tell him what machines and metal parts you want protected, where they are to be stored and how long. He'll recommend the product best suited to each need, and assist your men in proper application for maximum protection.

SOCONY-VACUUM OIL CO., INC.
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5. Progress Reports of Benefits Secured.

GARGOYLE Lubricants

TUNE IN "INFORMATION PLEASE"—MONDAY EVENINGS, 9:30 E.S.T.—NBC

Loaded cars moved into position for dumping at the mill.

Steelcar

Cars in process of being dumped.

Cars in full dump position after ore discharge.
Note steep dumping angle and clean discharge of load.

IN THE
NICARO NICKEL COMPANY'S
CUBA OPEN PIT MINE

"Rolling Trunnion" AIR DUMP CARS

(33.8 Cubic Yard Water Level Capacity)

ARE SUCCESSFULLY HANDLING AND DUMPING NICKEL BEARING ORE . . .
IN ANY KIND OF WEATHER

The ore at this mine—particularly in wet weather—is sticky. While ordinary dump cars dump to an angle of 50°, it was necessary in this instance to provide cars with a dumping angle of 65° to insure free and clean discharge of the load,—typical of Pressed Steel Car engineering ability to meet specific operating conditions.

Do you have our bulletin 72-C in your files?

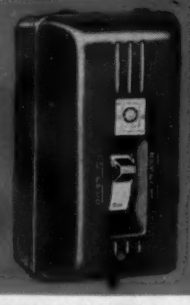
PRESSED STEEL CAR COMPANY, INC.
INDUSTRIAL DIVISION
PITTSBURGH, PENNSYLVANIA

Pick this enclosure... ..for this manual motor starting job

....get these Westinghouse Starter features!

NEMA Type 1

STANDARD SHEET STEEL ENCLOSURE



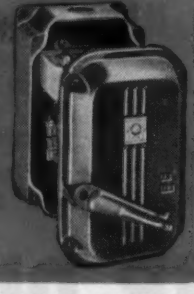
General-Purpose Indoor Applications —normal atmospheric conditions

"DE-ION" MOTOR WATCHMAN 10-100-S

NEMA Types III, IV & V

WATERTIGHT AND DUST-TIGHT CAST-IRON ENCLOSURES

(Rubber gasket between case and cover)



Outdoor applications including:

- Docks
- Canal locks
- Subways
- Tunnels

Indoor applications including:

- Dairies
- Breweries
- Steel mills
- Cement mills
- Woodworking plants

"DE-ION" MOTOR WATCHMAN 10-100-W

NEMA Types VII & IX

CAST-IRON ENCLOSURE FOR HAZARDOUS LOCATIONS

Class I, Group D and Class II, Groups E, F & G (Ground flanges on case and cover)

- Refineries
- Distilleries
- Varnish plants
- Flour mills
- Grain elevators
- Sugar, cocoa, coal pulverizing plants
- Aluminum and magnesium processing plants

"DE-ION" MOTOR WATCHMAN 10-100-U

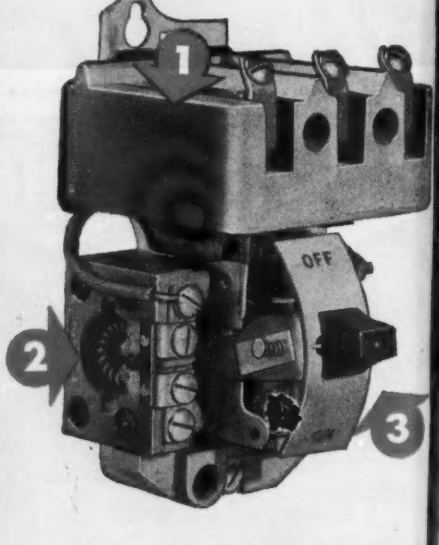
NEMA Type 1—S

FLUSH-MOUNTED SHEET STEEL ENCLOSURE

Same applications as standard sheet steel enclosures—where flush mounting is desired.

"DE-ION" MOTOR WATCHMAN 10-100-P

1. **"De-ion" Arc Quenchers.** Arcs go out *quick*, making contacts last longer.
2. **Bi-Metal Overload Relay.** Accurate calibration for life of starter. Permits harmless overloads—protects motor against dangerous running overloads or stalled rotor conditions.
3. **Quick-Make, Quick-Break Action.** Prevents teasing, prolongs contact life.



See your Westinghouse Distributor for full details or write for D. B. 10-100. Westinghouse Electric Corp., P. O. Box 868, Pittsburgh 30, Pa.

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THE YOUNGSTOWN SHEET AND TUBE COMPANY

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Ultramodern Once

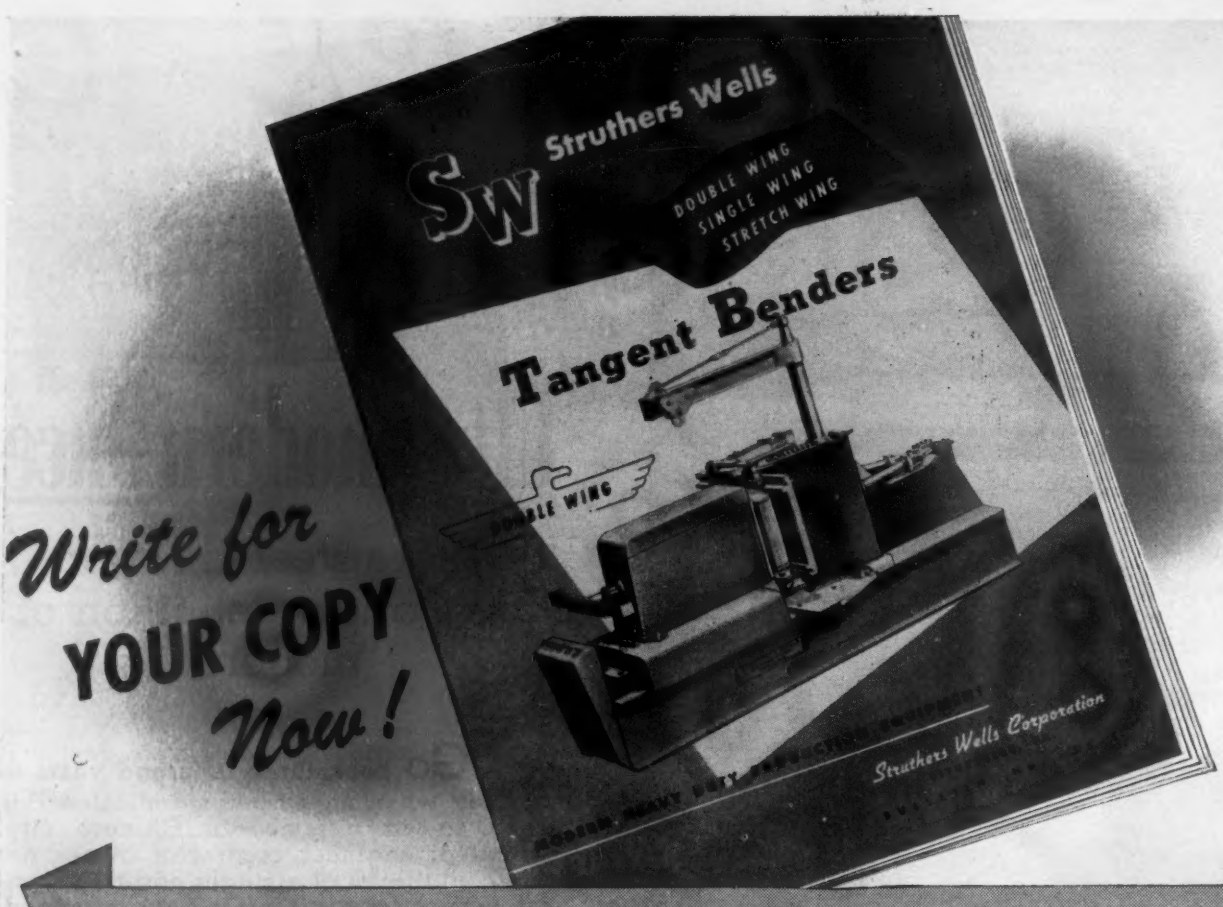
before steel changed the world's definition of "modern"

Go back three thousand years to the day when an emperor dedicated this street in an ultramodern Chinese city. Architect, engineer, contractor, owner, not one could think of a single additional improvement to make this a more beautiful, more comfortable, more luxurious place in which to live.

Splendid through the ages, in its solid stonework and sweeping tile roofs, street and city have endured until now. But today this place is among the most primitive, most comfortless habitations of civilized man. There is complete lack of sanitation. There are no sewers. Garbage and filth choke the street. The only running water is what trickles down the gutters when it rains. In fact, probably no dweller on this old world street has ever heard of hot and cold running water, piped to bathrooms and lavatories, laundries and kitchens, in the accepted American way!

Why should we in America be so far ahead of the rest of the world in sanitation and cleanliness--typified by our towering hotels with a bath for every room, our skyscrapers with refrigerated drinking water on every floor, our homes with their deluxe accommodations of built-in laundry tubs, automatic washers, porcelain sinks, bathtubs, showers, lavatories?

You know the answer. It's because we can have running water, water pumped through steel pipes. And we have pipes at low cost and in unlimited quantity, because *steel* is so plentiful and so inexpensive. The term "modern" *today* signifies "liberal use of steel." Our task for today and tomorrow is to modernize America and the world, through the wider, more liberal use of steel pipe and the other thousands of steel products.



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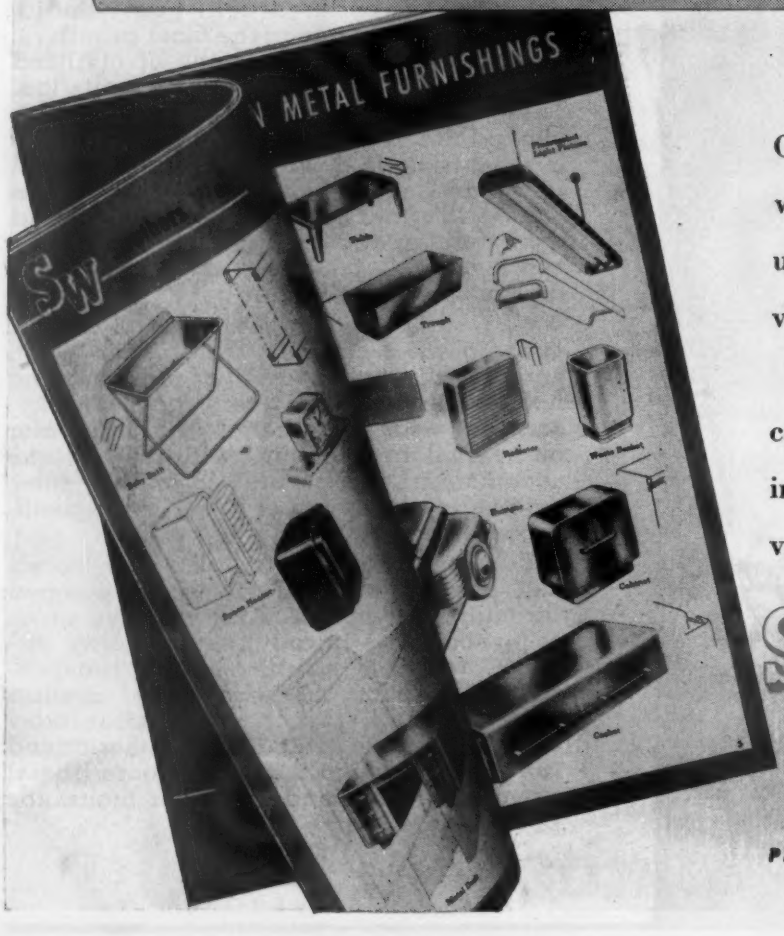

Completely filled from cover to cover with important engineering data, product designs, specifications and other vital information.

If your product involves the fabrication of sheet metal—a copy of this important bulletin should prove invaluable. Write today.

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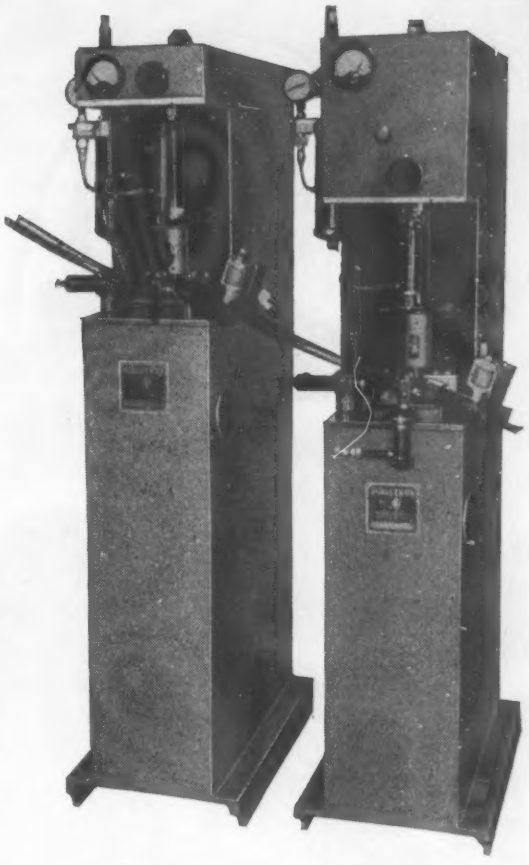
SPECIALTIES DIVISION
TITUSVILLE, PENNA.
PLANTS AT TITUSVILLE AND WARREN, PA.
Offices in Principal Cities

How AUTOMATIC INSPECTION answers postwar competition



Peacetime competition is vastly different from wartime cooperation. Your customers want a *better product* with quantities available *more rapidly*, *costing less*, yet maintaining *greater uniformity* and *quality*. Hurletron automatic inspection machines, customer built for your production requirements, answer postwar competition!

In industries all over the country, Hurletron Automatic Inspection Machines are saving dollars every minute . . . reducing production time . . . and improving product quality.

For instance, these Hurletrons AB and UB48-100 (above) are saving $108.00 per shift per day in labor costs alone for one manufacturer.

In another plant, Hurletron BVA-100 (left) is automatically making three inspections simultaneously, two electrical and one physical, 78 times per minute, and selectively sorting rejects. Labor saving alone amounts to $76.80 per shift per day.

These two examples provide striking illustrations of the greatly reduced production costs possible with Hurletrons. But . . . important as it is, dollar saving is only one of the outstanding advantages provided by this modern method of automatic inspection.

Hurletron Automatic Inspection Machines

- *Eliminate the human element*
- *Increase accuracy and fidelity*
- *Increase production rate*
- *Automatically index parts to be inspected*
- *Selectively sort automatically*

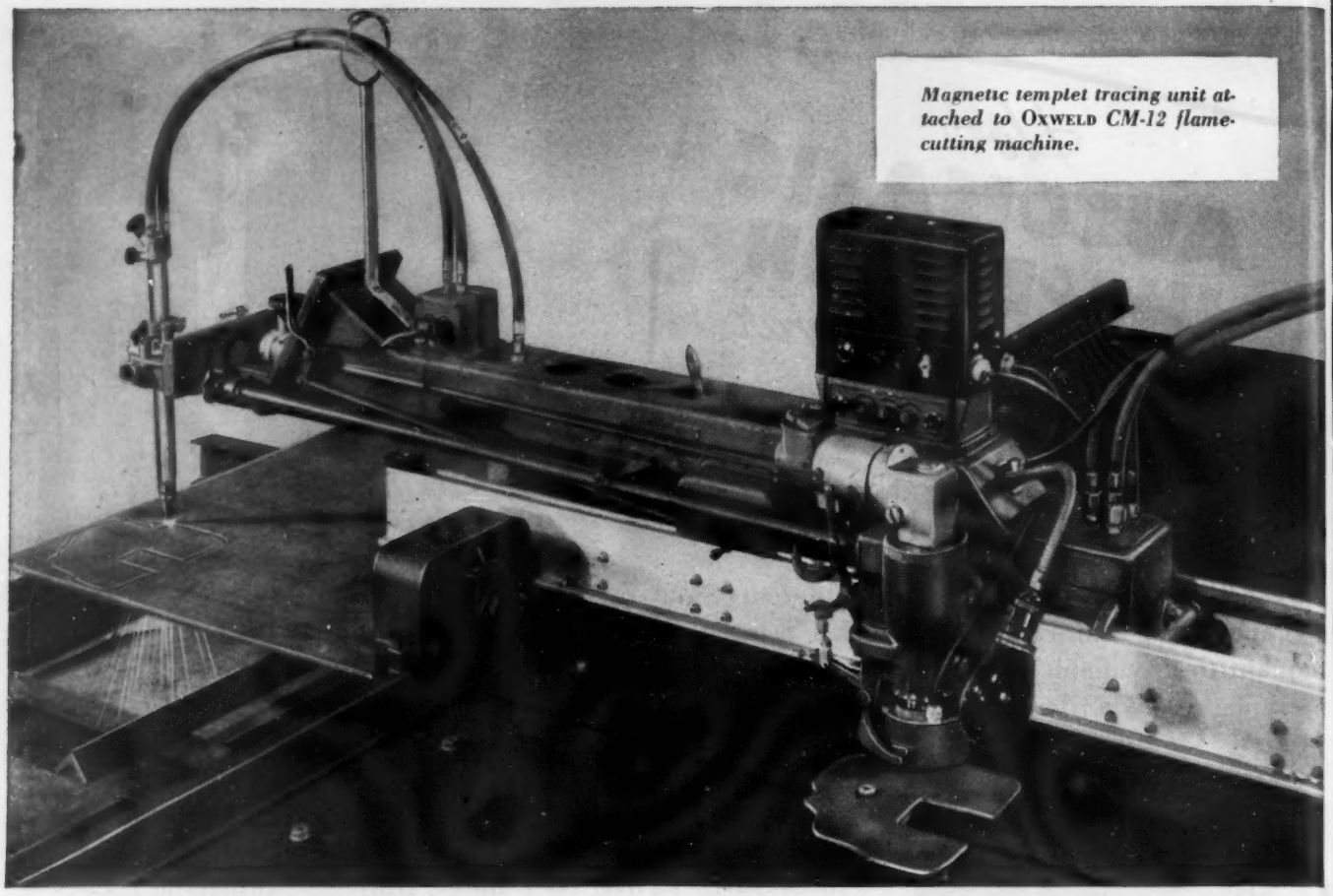
Your inspection problems may well be solved by Hurletron Automatic Inspection Machines. Send us details today. There's no obligation.

HURLETRON

Automatic Electronic

INSPECTION • CONTROL • ASSEMBLY

ELECTRIC EYE EQUIPMENT COMPANY • 11 West Fairchild Street • Danville, Illinois



Magnetic templet tracing unit attached to OXWELD *CM-12 flame-cutting machine.*

MINIMIZE MACHINING ON SHAPE-CUT PARTS

Use Magnetic Tracers on OXWELD Flame-Cutting Machines

OXWELD magnetic tracers automatically guide the oxy-acetylene blowpipe to produce identical shapes time after time. These tracers follow templets of any shape—even with 90-degree corners—without deviation. Templets can be finish-machined to exact dimensions, and because they are made of steel, they retain their accuracy on quantity runs. OXWELD magnetic tracers are simple in their operation... a magnetic roller, following the prepared templet, drives the machine at a uniform controlled speed.

If you use an OXWELD CM-12, CM-15, or CM-23 flame-cutting machine, you can obtain a magnetic tracing unit for it. If you are considering a new machine for repetitive cutting of complicated parts with close tolerances, or if you are now shaping metal parts by another method, you should investigate the advantages of an OXWELD machine equipped for magnetic tracing. Complete information on making templets is supplied with each unit.

Write to any Linde office for additional information.

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Unit of Union Carbide and Carbon Corporation

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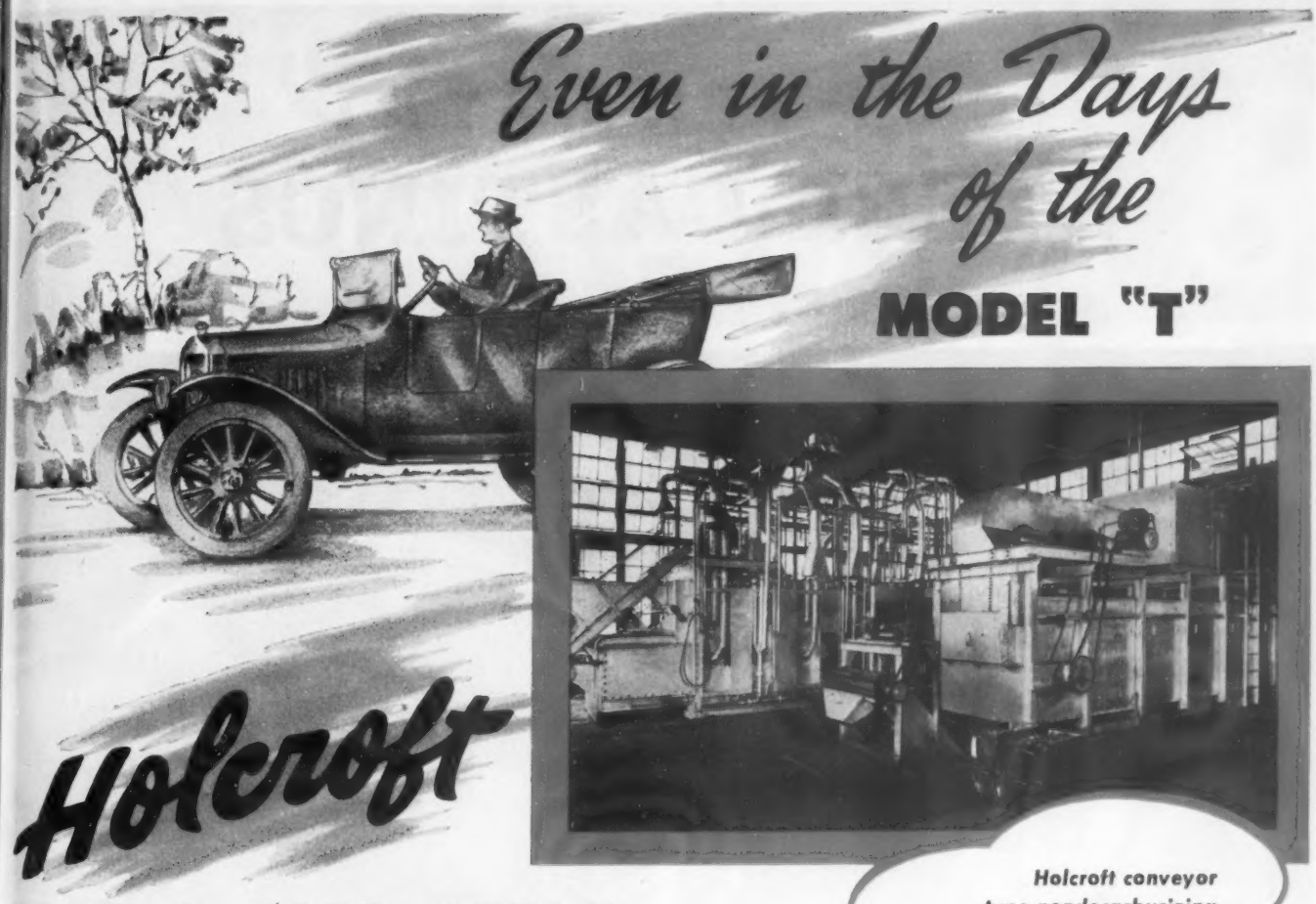
The words "Linde," "Oxweld," "Prest-O-Lite," "Prest-O-Weld," "Purox," "Union," and "Unionmelt" are trade-marks of Union Carbide and Carbon Corporation or its Units.



Holcroft conveyor type nondecarburizing furnace unit recently installed in automotive plant.

WAS A STEP AHEAD IN FURNACE ENGINEERING

PRIDE and joy of millions was the latest-model Ford . . . back in 1921. And the manufacture of cars, farm machinery and many other metal products was given a sizable boost in that same year by introduction of the continuous pusher type electric heat treating furnace—one of many original Holcroft developments.

For nearly 30 years, Holcroft and Company have *pioneered* in the design and construction of furnaces for heat treating, carburizing and similar metallurgical processes—furnaces individually engineered to the specific demands of the job at hand.

Today, as in the heyday of the Model T, Holcroft furnaces are widely used throughout the automotive and other industries where closely-controlled quality of work and economy of operation must be combined with high production. If YOU are planning to install a heat treat furnace for production work of any type, it will pay you to consult first with Holcroft furnace engineers.

BUILT BY HOLCROFT & COMPANY DETROIT-MICH.

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Continental carbon and alloy steel castings have earned the reputation throughout the steel producing industry for their dependability to withstand punishing service.

Continental also manufactures rolls, steel mill equipment and special machinery.

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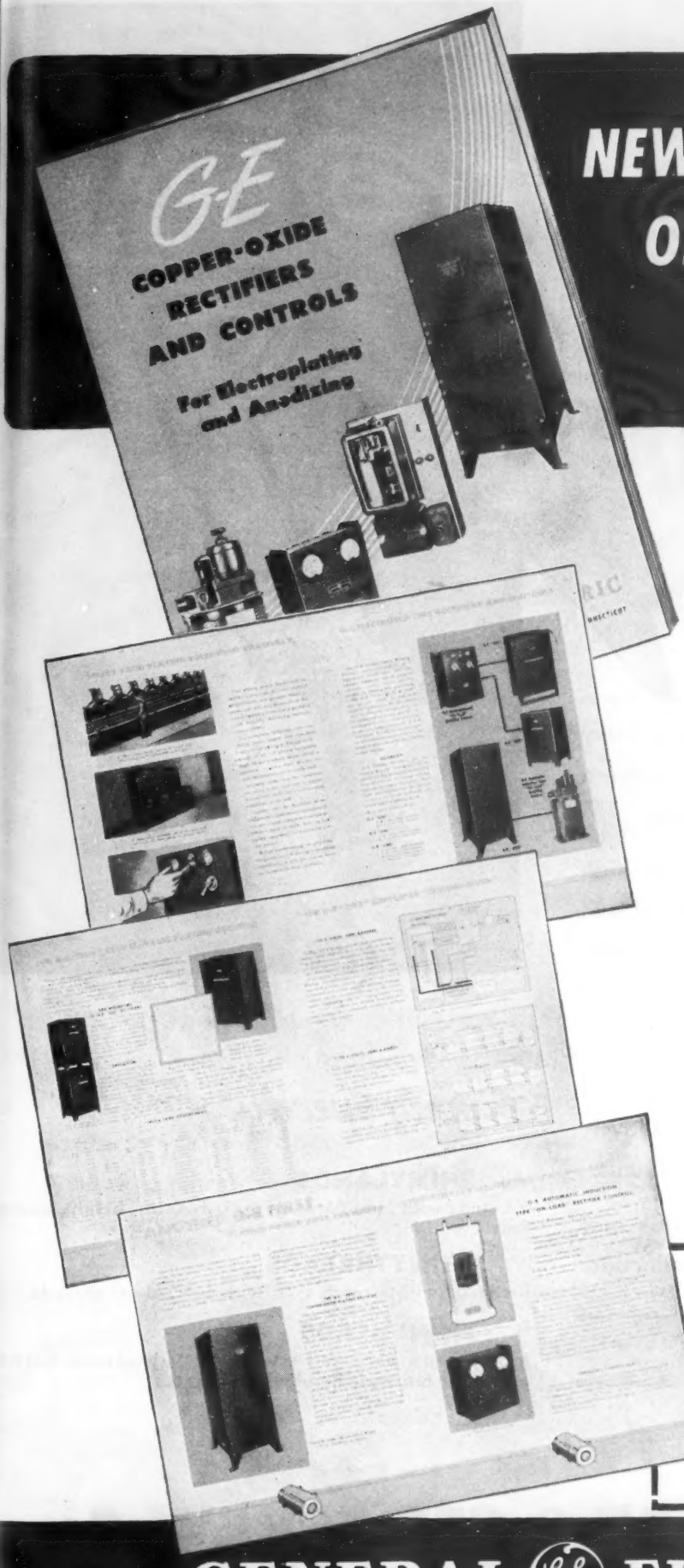

NEW CATALOG OFFERS AIDS TO LOWER COSTS

Use It To Select Power Equipment For Your Plating Or Anodizing Shop

Here is a catalog written by engineers—for engineers—yet it has data, tables and illustrations so complete that all engaged in the electroplating or anodizing industries will find it useful.

It tells a comprehensive story about G-E Copper-oxide rectifiers and controls—their characteristics, construction, applications.

A feature of the catalog is a section which explains how G-E automatic power equipment will accurately maintain constant tank voltage from *no load* to *full load* and provide smooth *on load* steady adjustment of d-c power over the equipment's entire output voltage range.

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GENERAL ELECTRIC

AND NOW SHINYLAND by FERRY CAP

● This is the new name for the new Ferry Cap stud with its shiny *land* between threads—shiny, bright mirror-finish.

Shinylands of the usual Ferry Cap high quality are furnished to regular milled stud standards with this additional feature—the land between threads a shiny, bright mirror-finish.

Shinylands are carried in stock in standard catalog sizes in bulk and in attractively labeled packages. Sizes, ¼" dia. and under.

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Simply Specify

SHINYLANDS
for studs with land between threads shiny, bright mirror-finish.

SHINYTHREADS
for studs with aircraft quality, bright, shiny threads.

SHINYHEADS
for hexagon head cap screws of high carbon C-1038 steel, full finished, bright, shiny heads.

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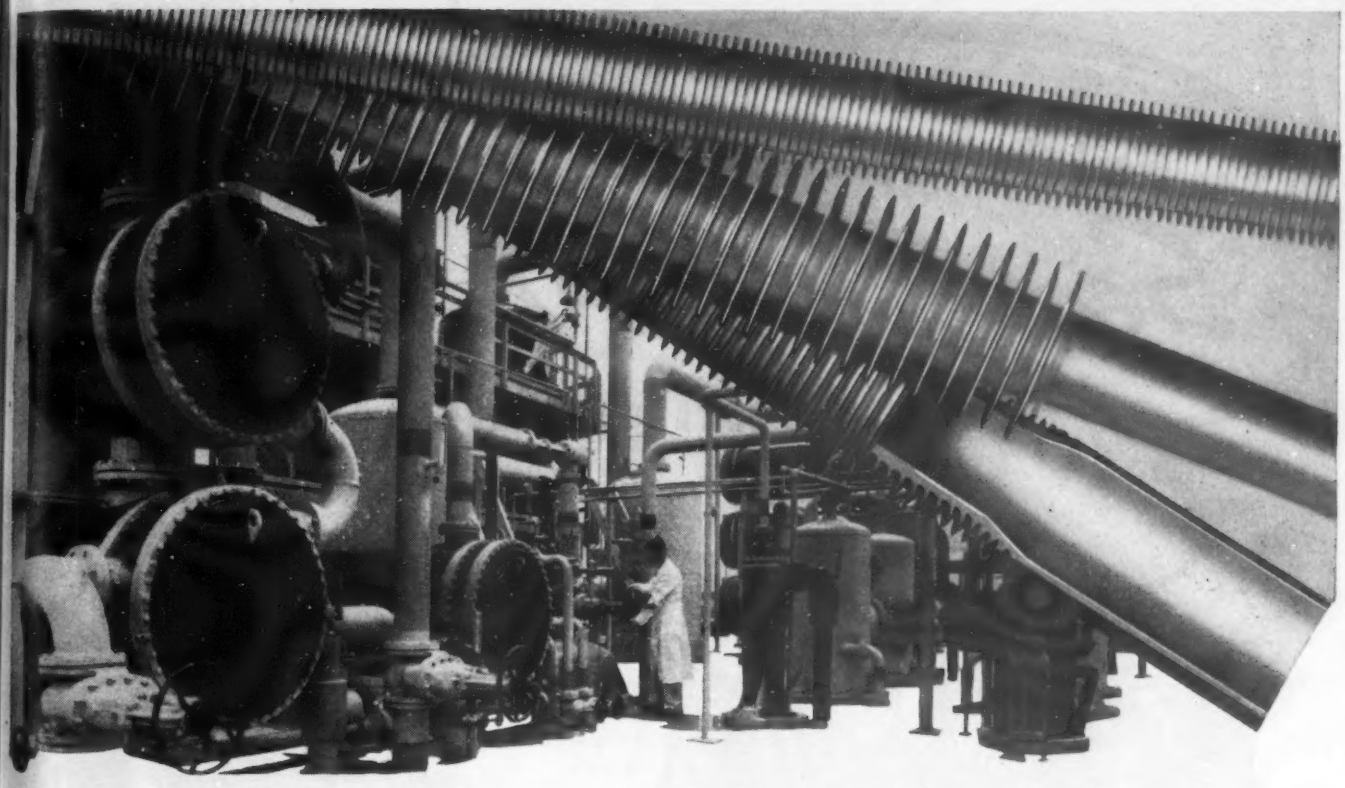

A view of the Firestone Tire & Rubber Co. plant at Lake Charles, La., which uses TRUFIN in the interchangers of the Carrier centrifugal refrigerating machines, chilling water for the condensation of vapors in the process of making synthetic rubber.

WOLVERINE TRUFIN IS SPECIFIED

for use where extreme heat changes are encountered

The fins of TRUFIN are extruded from the original tube. Thus, having the fins integral with the tube, TRUFIN possesses the distinction of being capable of withstanding extreme heat changes and severe vibrations—a quality, which, you will agree, is most desirable in heat exchangers. Here is dependability and economy!

TRUFIN is available, in seamless copper and brass tubing, in a variety of diameters and fin heights and spacings. It can also be bent and formed to meet any requirements.

Send for "TRUFIN Engineering Reports", which give you technical information about use of finned tube.

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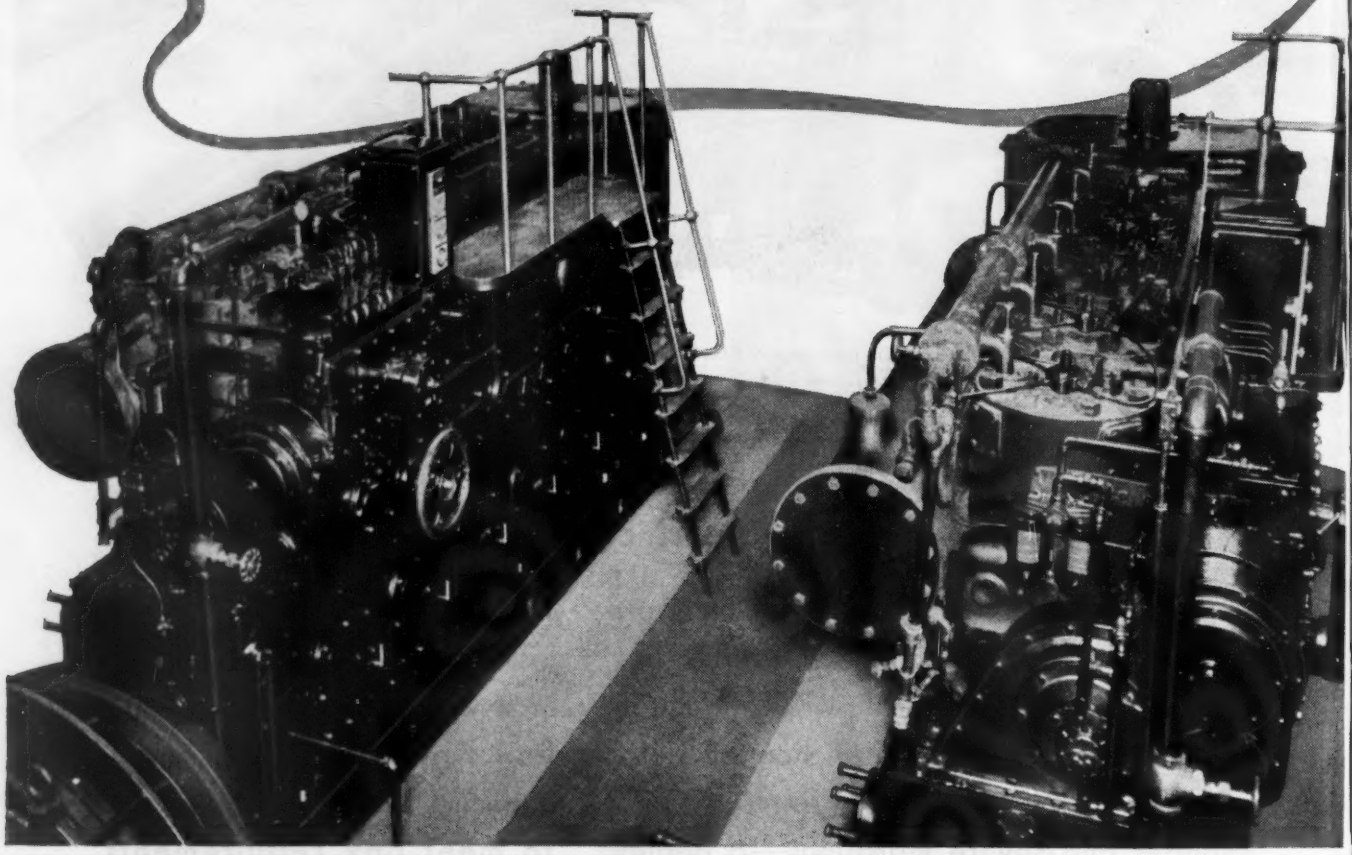

For years the big Bourne Mills of Fall River, Mass., operated a steam plant for two-thirds of their power needs and bought the remainder at an annual cost of $36,000 to $40,000.

Then two 500-hp. Fairbanks-Morse Diesels were installed. These two heavy-duty Diesels are now producing power for less than eight-tenths of a cent per kw-h.

At this rate the annual saving on all costs for operation and maintenance is almost exactly $10,000.

A Fairbanks-Morse engineer will tell you how much Diesel power can save in your plant. Write Fairbanks, Morse & Co., Fairbanks-Morse Building, Chicago 5, Ill.

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STEEL

The Magazine of Metalworking and Metalproducing

VOL. 117, NO. 20 NOV. 12, 1945

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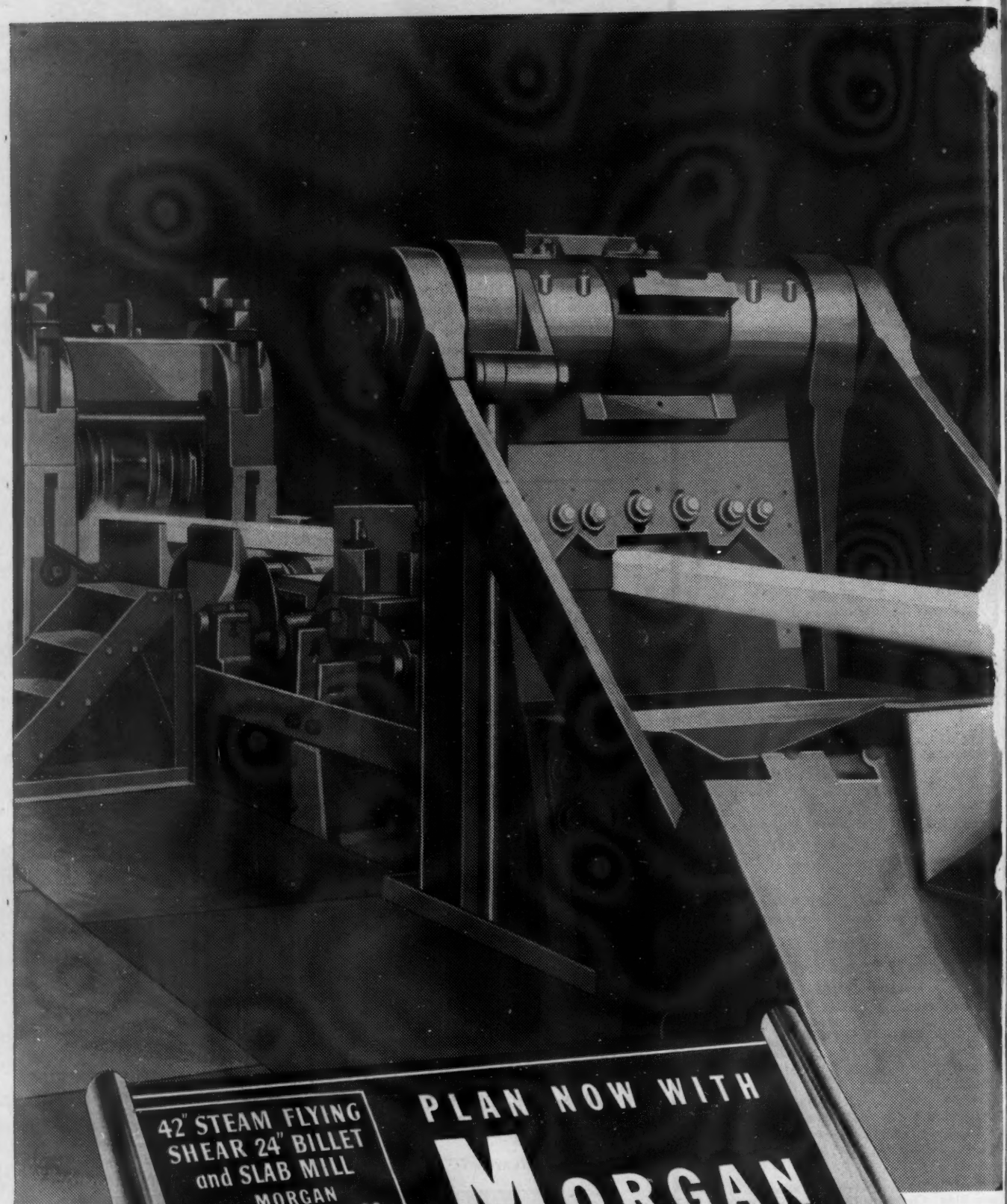
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STEEL
November 12, 1945

Statistical Red Flags

For many years the Annual Statistical Report of the American Iron & Steel Institute dealt only with figures pertaining to production and prices. Several years ago, some information on investment, income, number of employees and dividends was introduced into the book. In the 1944 report, just issued, one finds new tables on balance sheet and income data and more detailed figures on number of employees, hours worked and wages.

This tendency to augment important production and price data with an increasing amount of information on finance and employment is gratifying. It is in keeping with the mounting interest manifested by all types of people in the economics of business. It is to be hoped that the institute in future years will continue to expand its statistics on broad economic factors and that other industrial associations will round out their statistical services so as to present a clearer picture of the economic status of their respective industries.

An excellent example of how values can be derived from this expanded statistical service is afforded by the table on pages 6 and 7 of the institute's 1944 report. Among other data, this table shows the number of employees and stockholders of steel companies at the end of each year from 1935 to 1944, inclusive. In 1935, the industry reported 547,112 employees and 551,832 stockholders. Note well the fact that after the prolonged depression of the thirties, which certainly discouraged stock ownership, the number of stockholders exceeded the number of employees by 4720. At the end of 1944 employees numbered 869,493 and stockholders numbered 492,509. In short, in a decade the number of employees increased from 547,112 to 869,493—a gain of 59 per cent—whereas the number of stockholders declined from 551,832 to 492,509, a drop of 11 per cent.

It is true, of course, that the war provides an obvious explanation for the sharp rise in employment. It is true also that the trend in number of stockholders is not steady or consistent. The sharpest declines in number of stockholders occurred in 1936 and 1944.

Nevertheless, this narrowing of the base of ownership of steel companies can be construed as a red flag warning us of danger. It probably means that the overall effect of unsound government policies in respect to business is discouraging investors from risking their savings in private enterprise.

More statistical light on the basic economic factors affecting industry would help tremendously in the fight against crackpot government policies.

RETROACTIVE RACKET: One of the great injustices inflicted upon industry by the federal government is the assessment of penalties or damages retroactively after an administrator or a court has reversed a previous ruling or a decision.

Frequently an employer, having complied fully with the provisions of a law as currently interpreted by the authorized government officials, finds himself liable for large sums for past services of employees, some of whom may be no longer in his employ, but whose right to collect can be asserted as much as 12 years after the services were rendered—all because a government administration or court had reversed its opinion.

This outrageous practice of employing the retroactive factor to make a criminal out of a law-abiding employer can be attributed, first, to anti-business New Dealers who deliberately refrained from incorporating statutes of limitation in most of the laws introduced since 1933 and, secondly, to Congress for not noticing this clever and diabolical omission.

Fortunately, Congress is beginning to correct its

(OVER)

error. The powerful House Judiciary Committee has approved H.R. 2788 which would establish a statute of limitations against retroactive liabilities under numerous federal laws which do not contain specific statutes of limitation. In the interest of simple honesty in government, Congress should pass this bill promptly. —p. 98

• • •

ELECTRONIC SPRAYING: Although the principles of electronics have been applied successfully to numerous industrial operations, manufacturers probably are just beginning to scratch the surface of the possibilities in this field.

A case in point is electrostatic spraying. In recent years the electrostatic spraying process commanded considerable attention because it made possible the production of high-quality, uniformly-coated articles with a minimum loss of coating materials.

Now experiments are being made on the electrostatic spraying of porcelain enamels. The process consists of charging the spray particles in an electric field and the attraction of these particles to the object to be coated. Theoretically it is not unlike electroplating, except that the spray particles are suspended in air whereas in electroplating the metallic particles are suspended in a water medium.

Tests indicate that this process of applying porcelain enamel may prove advantageous on flat or cylindrical ware with simple flanges or symmetrical shapes, particularly when highly repetitive operations are possible. —p. 118

• • •

WHAT IS A BARGAIN? "During the term of this agreement, neither the union nor any employee, individually or collectively, shall cause or take part in any strike, or other interruption or any impeding of production at any plant of the company covered by this agreement.

"The terms and conditions of this agreement shall continue in effect until Oct. 15, 1946."

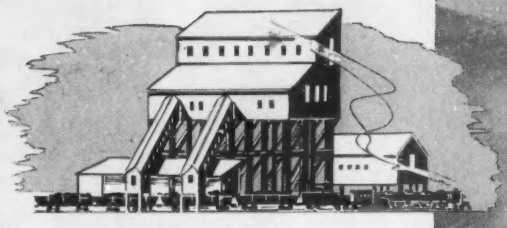
These paragraphs are from the contract signed by Republic Steel Corp. and the United Steelworkers of America dated April 11, 1945. USA (CIO) has requested the National Labor Relations Board to take a strike vote of Republic employees under the provisions of the War Labor Disputes Act.

General counsel of Republic writes NLRB that Congress never intended that the strike vote provisions of this act or the facilities of NLRB should be used for contract-breaking purposes. It is curious that the government talks about restoring true collective bargaining at the same time its agencies are actively helping unions to break true bargains. —p. 91

POSTWAR POSTSCRIPTS: As the War Production Board goes out of existence and the Civilian Production Administration takes over (p. 95) progress in reconversion is seriously hampered by strikes, labor shortages, lack of materials and component parts and confusion over price policy. Manufacturers of a wide variety of consumer goods report that their production is from 15 to 75 per cent below the level they had expected in the fourth quarter. . . . American Iron & Steel Institute's figures on shipments of steel products to principal consuming industries in 1944 (p. 103) shows that shipbuilding retained its lead as the No. 1 consumer. It took 17 per cent of the total, jobbers and warehousemen accounted for 13 per cent and the railroads consumed 9 per cent. . . . George Christopher, president of Packard, refers to the present as the "period of reconfusion" (p. 105), which is an apt expression. . . . Secretary of Commerce Wallace's report on how much of a wage increase industry can absorb without an increase in prices elicited violent rebuttals in Detroit (p. 106) by Messrs. Rising, Christopher and Romney. . . . Fruehauf Trailer Co. will start work immediately on a one-floor, 400 by 2250-foot truck-trailer assembly plant at Avon Lake, O. (p. 116) 20 miles west of Cleveland. It will be the world's largest trailer plant and will employ 2500 persons. . . . Bituminous coal output (p. 194) more than doubled in the first full week of work after the miners' strike. . . . Jessop Steel Co. is using the sodium hydride descaling process (p. 123), finding it particularly advantageous in descaling stainless steels of all types. . . . Last August United States Steel withdrew an offer to consider leasing or purchasing the Geneva steel plant on the ground that statements by government officials seemed "to rule out U. S. Steel as a prospective lessee or purchaser." Last week W. Stuart Symington, head of SPA, told a subcommittee of the Senate (p. 92) that "SPA feels that the best company to have purchase this plant would be the United States Steel Corp. . . . It may be the only company that can carry on this operation unless the government subsidizes it". . . . Richard T. Frankensteen, CIO candidate for mayor of Detroit lost out last Tuesday (p. 105) as did a number of CIO-PAC sponsored communists running for lesser offices in other industrial cities. This is gratifying. Unfortunately, however, they will be back next time.

E. L. Shaner

EDITOR-IN-CHIEF



This 23 yard Inland Hi-Steel bucket, at the right, saved $23,000 the first year.

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Industry and labor must get together and end current industrial strife, as the administration wartime controls soon will be removed, President Truman tells the opening session of the National Labor-Management Conference. NEA photo

Labor-Management Conferees Seek Ways To Minimize Disputes

Industry and AFL delegates resist attempts by CIO representatives to inject current wage demand into agenda. President warns solution to industrial relations problems will be found "some place else" if conference fails

TOP representatives of industry and trade unions last week waded through the preliminaries of the National Labor-Management Conference which is attempting to formulate a national policy to govern the conduct of industrial relations.

Early sessions of the conference brought forth no definite program for minimizing industrial disputes. They did, however, reveal a determination on the part of the majority of delegates to hold the conference to the development of a long-range plan for bettering industrial relationships.

This determination was made apparent by the delegates in overriding attempts by Congress of Industrial Organizations representatives to inject the current wage issues into the deliberations. Management and American Federation of Labor delegates appeared united in an effort to hold the conference to the agenda and to exclude, as AFL President William Green put it, "controversial subjects, such as wages, full employment and legislation."

Impartial observers applauded this action as it was generally conceded that the conference could be wrecked quickly and completely if the delegates undertook consideration of current wage demands—a subject on which they could make no binding decisions, but one which would be almost certain to arouse ill feeling and destroy the purpose of the meeting.

In opening the conference, President Truman told the delegates their job was to find ways and means "of resolving their differences without stopping production."

The answers to this problem must be found, the President warned. "If the people do not find them here, they will find them some place else."

Three of the four members of the committee of principals, Ira Mosher, representing the National Association of Manufacturers; Eric Johnston, United States Chamber of Commerce; Mr. Green, AFL; and Philip Murray, Congress of Industrial Organizations, in opening speeches stressed the importance of striving for a long-range program for minimizing disputes. The fourth, Mr. Murray, asked that the conference consider wages.

The majority aim of the conference was fairly expressed by Mr. Johnston: "There is one fundamental result which must flow from this conference. This nation needs a code of conduct, a national charter, a set of principles, a national policy to govern the conduct of industrial relations. This code should rest on the foundation of four fundamental principles:

"First: Labor unions are now woven into our economic fabric and collective bargaining is an essential part of the democratic process. The nation and industry must accept this as a fact. I

mean accept it, not from the lips, but from the heart.

"Second: Management must retain the unabridged right to manage. Its right to initiate, the right to make decisions, must remain where it is now.

"Third: Both labor and management must recognize that ever higher standards of living come only from increased productivity. Anything which retards output or cuts into quality becomes by definition immoral, antisocial and untenable.

"Fourth: The consumer, the worker and the investor must all share equitably in the fruits of increased production. Their respective shares might be labeled lower prices, higher wages, sounder profits. There is no limit to the abundance of good living which can flow from the wholehearted acceptance of this principle."

Mr. Green and Mr. Mosher agreed that the conference should not be made a collective bargaining conference but should be restricted to the items listed on the agenda—all designed to minimize industrial friction.

Most of the early sessions was devoted to the preliminary statements of aims and principles and to organization.

Generally, organization proceeded smoothly and according to preliminary plans. Only notable exception was in the establishment of the important executive committee. The agenda called for a committee of eight members and a non-voting chairman, these to include four representatives of management and two each from the CIO and the AFL. To this, John L. Lewis, president of the United Mine Workers, raised strenuous objections and the committee was increased to 16 voting members, as follows: For management, Eric Johnston, Ira Mosher, M. W. Clement, John Holmes, H. W. Prentis Jr., William M. Rand, David Sarnoff and Herman W. Steinkraus; for labor, Philip Murray, R. J. Thomas and Lee Pressman, representing the CIO; William Green, Mathew Woll and George M. Harrison, representing the AFL; John L. Lewis, representing the mine workers; and T. C. Cashen, representing the railroad brotherhoods.

Six other committees named, and management's representatives, are: Collective bargaining, Carl Borg, E. J. Thomas, C. W. Gaylord, Almon E. Roth, Walter M. Ringer, John A. Stephens, and W. J. Grede.

Management's right to manage: H. W. Prentis Jr., Charles R. Hook, E. J. Robeson Jr., Stanley B. Grove, C. O. Skinner and C. E. Wilson.

Jurisdictional disputes: Harry Woodhead, E. N. Allen, C. W. Doherty, W. H. Winans.

Conciliation: William M. Rand, Noah Dietrich, Leonard R. Hurtz, and Louis Ruthenberg.

Initial collective agreements: John Holmes, M. M. Anderson, Charles A. Eaton Jr., Lee Hill, T. O. Moore and E. P. Palmer.

Existing agreements: H. W. Steinkraus, W. P. Ahearn, Powell C. Groner, H. D. Hailey, George H. Love and James Tenham.

Number of Workers Hit By Strikes Totals 275,000

Number of workers on strike or involved in work stoppages throughout the country last week was estimated at 275,000.

During the week work on reconverting the Willow Run plant near Detroit to automobile production was resumed after a 6-day strike.

John L. Lewis, president of the United Mine Workers, accepts the challenge of independent unions picketing the National Labor-Management Conference and crosses the picket lines. Pickets were protesting the fact that independent unions were not represented at the sessions. NEA photo

U. S. Steel Declines To Reopen Wage Parley Pending Price Adjustment

PROPOSAL of Secretary of Labor Schwellenbach that the United States Steel Corp. reopen wage negotiations with the United Steelworkers of America (CIO) under a special negotiator was declined last week by Benjamin F. Fairless, president of the corporation.

Mr. Fairless, in a letter to Secretary Schwellenbach stated that existing price ceilings do not enable the corporation to grant a wage increase at this time and that wage discussions would be useless until the question of prices was settled.

Resumption of collective bargaining between the corporation and the union was proposed by Secretary Schwellenbach earlier in the week at which time he named Arthur S. Meyer, chairman of the New York state mediation board to serve as special conciliator in the dispute.

Initial bargaining negotiations on the union's demand for a $2 per day wage increase were terminated Oct. 23 when the corporation refused the union's demands. On Oct. 29 the union petitioned the National Labor Relations Board for a strike vote in the steel industry, other steelmakers having taken the same position as U. S. Steel on wages.

Corporation Restates Position

In his letter to Secretary Schwellenbach declining to reopen negotiations until the price question was settled, Mr. Fairless said:

"Our position with respect to this heavy wage demand is set forth in the letter from Mr. John A. Stephens, vice-president, Industrial Relations, United States Steel Corp. of Delaware, to Mr. Murray dated Oct. 23, 1945.

"President Truman's recent speech does not change the basic situation described in Mr. Stephens' letter to Mr. Murray.

"Existing OPA ceiling prices for steel products do not enable us to grant a wage increase at this time. In view of this determining factor, it seems futile to appear to engage in collective bargaining conferences on the union's demand for a general $2 a day wage increase until after OPA has acted on the long-pending application of the steel industry for substantial increases in present ceiling prices for steel products to compensate for past heavy increases in costs.

"Such present ceiling prices are little above the quoted prices for steel before the war. Labor and other costs in the steel industry, on the other hand, have gone up tremendously since 1940. As a consequence, a great majority of our steel products are today being sold at a loss. We believe carbon steel prices should immediately be increased on the average approximately $7 a ton by reason of these past increases in costs.

"If progress is desired in the direction of resolving the union's wage demand through sincere collective bargaining, as you suggest, the first step is through prompt and fair action by OPA in granting adequate increases in present ceiling prices for steel products so as to compensate for substantial past increases in our costs.

"In addition, we must have adequate insurance from OPA that such ceiling prices will also be increased so as simultaneously to compensate for any wage increase which may result from the union's present wage demand. We should not be expected by anyone to carry on our steel operations at a loss."

Republic Asks Dismissal of Union Petition For Strike Vote; Cites Contract Provision

DISMISSAL of the United Steelworkers' petition for a strike vote in the plants of Republic Steel Corp., Cleveland, was asked of the National Labor Relations Board last week by company counsel on the ground that Republic's contract with the union expressly prohibits any strike during the life of the pact. The contract was signed April 11, 1945, and continues in effect until Oct. 15, 1946.

In a letter to Paul M. Herzog, NLRB chairman, Thomas F. Patton, Republic vice president and general counsel, calls attention to section 10 of the contract:

"During the term of this agreement, neither the union nor any employee, individually or collectively, shall cause or take part in any strike, or other interruption or any impeding of production at any plant of the company covered by this agreement."

In return for the no-strike clause, Mr. Patton points out, and for the express purpose of making that clause effective, the union was granted maintenance of membership and the checkoff of dues.

"The obvious purpose of the union in requesting the strike vote is to lay a basis for calling a strike—action which it voluntarily renounced in its contract with Republic until Oct. 15, 1946. It is all too apparent that by seeking to enlist the facilities of the National Labor Relations Board to take the strike vote, the union is endeavoring to dupe the public by making it appear as though the federal government may be approving a strike which would be a deliberate violation of the union's contract."

General Motors, Rejecting 30 Per Cent Wage Boost Demand, Offers Cost-Of-Living Raise

COST-OF-LIVING wage increase offered by General Motors Corp. last week was rejected by the United Auto Workers' union (CIO).

In making its offer, General Motors formally declined to accede to the union's demand for a 30 per cent wage boost, terming the demand "excessive." In its stead, however, it offered increases in classifications where since 1941 wages have not been raised in proportion to the rise in the cost of living.

This raise, said a spokesman for General Motors, would amount to an average of 8 to 10 per cent for the corporation's 180,000 hourly-rated employees, and in computing the amount to which each worker is entitled the corporation is willing to accept the government's findings that living costs have increased 30 per cent since Jan. 1, 1941.

C. E. Wilson, president of the corporation, in its brief, rejected the theory of ability to pay as a valid argument for higher wages, maintaining that to demand General Motors pay its employees more than other companies pay is just as unreasonable as it would be to demand that the firm pay higher freight rates.

"General Motors Corp.," said Mr. Wilson, "is not willing to pay out in excess wages for work not performed money saved up for many years to modernize and expand its plants and provide more jobs. The money cannot be spent twice. The union is really proposing that the taxpayers of the country be called upon to subsidize either unjustifiably high wages or uneconomically low prices on General Motors products."

Rejection of General Motors' offer by the union indicated that it intended to press its demands to the limit. Further indicating that the union will seek to squeeze the corporation as far as possible, Walter P. Reuther, vice president of the auto workers' union, in a telegram to President Truman asked that the fixing of ceiling prices on 1946 automobiles be withheld pending a review by the Office of War Mobilization and Reconversion.

Favor U. S. Steel To Operate Geneva

Surplus Property Administrator Symington tells Senate committee he believes Corporation only one that can handle plant without government subsidy

OPERATION of the Geneva Steel Co. plant, largest of the war-born and government-owned units in the steel industry, by the United States Steel Corp. is favored by the Surplus Property Administration, W. Stuart Symington, head of the agency, last week told a subcommittee of the Senate Military Affairs Committee holding hearings on the disposition of surplus steel plants.

This represents an about face on the part of government spokesmen who earlier in the year were advocating "independent" operation of the western mill. U. S. Steel, in fact, last August withdrew an earlier offer to consider lease or purchase of the plant partially on the ground that statements by former Attorney General Biddle and members of the Surplus Property Board appeared "in practical effect to rule out United States Steel Corp. as a prospective lessee or purchaser of the Geneva plant."

Since that time, there has been a great lack of interest on the part of steel companies to acquire the Geneva plant and the only firm offer received has been one from Colorado Fuel & Iron Corp. to lease the plant, provided the government would install facilities for the production of peacetime products.

In opening the hearings before the committee, Chairman Joseph C. O'Mahoney stated that continued high operation of steel facilities would be necessary to the country's postwar economy and to assure that the government would be enabled to service its huge debt. Senator O'Mahoney warned those attending the hearings that a return to 60 per cent operations would mean "to fall back on a situation which will not permit free enterprise to work."

The government's first witness, Mr. Symington, had only proceeded far enough in describing the difficulties facing his agency in disposal of the plants, to mention that an offer of the Colorado Fuel & Iron Corp. for the Geneva plant at Provo, Utah, had been rejected, when E. Perry Holder, president of the Colorado company rose to point out that his company's offer was predicated on the belief that a 5-year lease, as provided by present law, is too short, and that 15 years might be a better term.

Mr. Symington rejoined that the govenment had refused the company's offer, one of the only three so far reported as showing any interest in the project, on the ground that it was too low.

"But the fact is," Mr. Holder put in, "it's the only offer you've got."

Mr. Symington objected to this statement, adding that even if it were the case, "we still would rather hold on to the plant until we get an offer that we consider fair to the government."

He revealed at this point that an arrangement has been concluded for temporary continuation of the Geneva plant in operation, after it was scheduled to close Nov. 10.

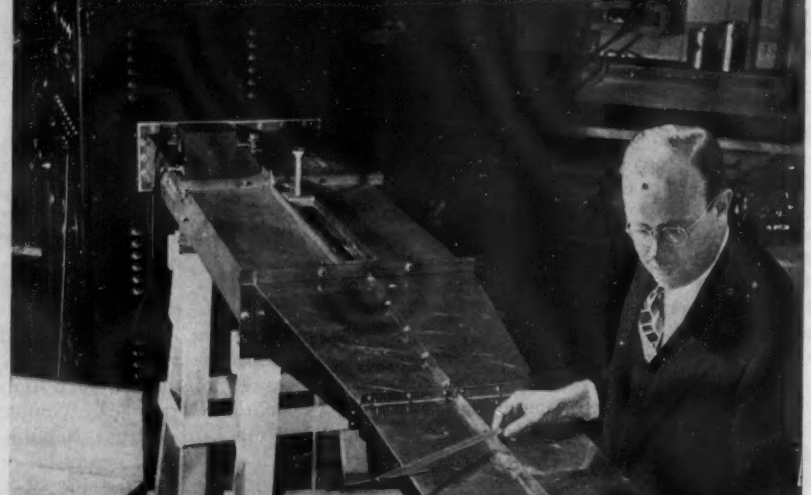
United States Steel Corp. has operated the Geneva plant, without charge or fee, and the existing agreement with this company was to have terminated Nov. 12. Mr. Symington reported at the hearing that a new agreement will be completed to run for 8 months, but which can be canceled at any time if a new operator is secured.

Chairman O'Mahoney also put into the record a letter from Rear Adm. Emory S. Land, chairman of the Maritime Commission, recommending that the plant be operated to manufacture plate that will be required for the postwar naval and shipbuilding program.

Mr. Symington referred to a finding of the Bureau of Mines, and to the attorney general's report on the plants, that it will be necessary to equip the Geneva plant for production to meet postwar market needs. Also, he reported, a readjustment of freight rates would be necessary, particularly if Geneva is to be enabled to supply tin plate to West Coast can manufacturers at prices that would prove unattractive to inland Eastern producers.

Some of these considerations were in Mr. Holder's mind, he indicated, in advocating a change in the leasing term, since, as he remarked afterward, the 5-year provision would barely allow time for the essential changes to be made, and was inadequate for a basis of profitable operation. In fact, he raised a question on hearing that the Geneva plant would be continued in operation, as to whether it was to be "a deficit operation."

The hearing developed conclusively that private companies were reluctant to undertake operation of any of the surplus government steel plants in their



ELECTRONIC "BLOW TORCH": Experimental model of dielectric heating unit which hurls high-frequency radio waves at an object to be polymerized, cured or bonded is demonstrated by Dr. J. A. Hutcheson, associate director of Westinghouse research laboratories. The unit, still in the laboratory stage, permits the projection of heat on an object wherever it may be, as opposed to present methods in which objects must be placed between metal plates or electrodes

present state, lacking some strong support from the government.

Henry C. Kaiser, operator of the Fontana plant, expressed doubt any company would want to buy Geneva as it now stands. And he went somewhat further than some earlier witnesses, in an exposition of the financing problem involved, and the attitude of the private operator on this score.

Mr. Kaiser made a strong plea before the committee for a decentralization of the steel industry that would provide a western industry in this field.

"There is serious doubt as to whether any private corporation or operator can afford to purchase the Geneva plant as it now stands," he said. "It may also be wise," he added later, "for the government to equip Geneva with certain peacetime facilities upon which there may be general agreement."

Senator Murdock, West Virginia, sugggested that it might be wise for the government to add an amount to permit an outright sale that would lead to salvage of the Geneva plant for postwar use.

Senator O'Mahoney after overnight consideration of Mr. Holder's objections to the 5-year lease said that if the 5-year limitation now in the law is found to be too short to permit lease or disposal of the plants, the committee should ask for legislation to correct the situation. A witness for the RFC had just expressed an opinion that Mr. Holder "had courage to submit a proposal under the conditions."

Will Discuss Purchase

Most of the hearing revolved about the merits or demerits of the Colorado Fuel & Iron Corp.'s offer to lease the Geneva plant. Mr. Holder, under questioning, emphasized that his company's offer was solely to lease the plant, and did not involve a sale, although, he revealed later, he had indicated the company's "interest" in a possible sale, and was to discuss this possibility later this month with RFC officials.

Mr. Holder frankly told the committee that the only way in which his company could entertain the deal was for the government to make the necessary investment to convert the Geneva plant for peacetime production. He and Sam Husbands, director of RFC, agreed that under the 5-year limitation on leases, "neither the company nor the government can justify any investment," as Mr. Holder said.

As originally proposed, according to Mr. Husbands, the Colorado Fuel & Iron lease offer would have involved an investment by the government of $71 million for peacetime facilities. Some of these would include $5,850,000 for revamping the plate mill to strip mill production, $24 million for a sheet and tin plate plant; $10,900,000 for a seamless tube mill, and $750,000 for miscellaneous additions.

This total would have been added to the government's original cost of $190 million, against which, Mr. Husbands argued, the lease terms would have given the government only a return of $788,000 if the plant operated at 100 per cent.

Mr. Holder pointed out that this originally projected government investment was later scaled down to $41 million. He said the company's terms actually, on this investment, would have returned $798,000 to the government at 100 per cent capacity, and the government's outlay would only have covered the first four items of reconversion. His own figures, he said, indicated that the government and Geneva would split $9 million return.

RFC officials declared that "under no conditions would they put in the installations" contemplated in the Colorado Fuel & Iron lease offer.

By inference, testimony of other steel industry men followed this line. Thomas E. Millsop, vice president, National Steel Corp., said his own company has projected an expansion program to cost $40 million, and he forecast that the costs would be as high, and perhaps higher, than the costs of similar work in the war.

This witness said also that he did not agree with the idea that disposing of the facilities built with taxpayers' money at a sacrifice would increase consumption.

He suggested it might be advisable for the government to have these steel plants "appraised at a proper value, and the government put that value on them, then hold them until the government can get what the plants are worth. Meanwhile, let private industry go ahead and expand." He said his company had made no offer.

A similar disclaimer was made by Roger Blough, general counsel, United States Steel Corp.

Mr. Holder joined with Henry Kaiser in the opinion that conditions exist in the West for successful utilization of Geneva, such as the presence of large ore bodies and the technical know-how.

W. Stuart Symington said his agency favored operation of Geneva by the U. S. Steel Corp. Explaining his position, in answer to questions, he said:

"The steel industry is an industry where an awful lot of money has to be put in, and the Surplus Property Administration feels that the best company to have purchase this plant would be the U. S. Steel Corp., because it has run it and it is tied up tight with its other mills on the West Coast.

"After looking at it," he continued, "we believe that it may be the only company in the steel industry that can carry on this operation unless the government subsidizes it."

Present, Past and Pending

■ ALLEGHENY LUDLUM TO CO-OPERATE ON STRIKE VOTE

PITTSBURGH—Allegheny Ludlum Steel Corp. last week notified NLRB it would cooperate fully on the strike vote scheduled at its plants Nov. 27 but pointed out by this strike poll both the NLRB and the company would be parties to a violation of the collective bargaining agreement between the company and the union if a strike results.

■ FONTANA GETS FRENCH ORDER FOR PLATES AND BARS

WASHINGTON—Henry J. Kaiser is furnishing the French Supply Mission with 100,000 tons of plates and 50,000 tons of bars from the Fontana, Calif., plant, according to reliable reports here.

■ AUTOMOBILE OUTPUT DROPS 74% BELOW SCHEDULE

WASHINGTON—Only 19,136 passenger cars, or about 26 per cent of expected output, were produced between July 1 and Oct. 1, Civilian Production Administration reported last week.

■ BIRMINGHAM STEEL FIRM BUYS MINNESOTA IRON ORE

BIRMINGHAM—Tennessee Coal, Iron & Railroad Co. has in transit 200,000 tons of Minnesota iron ore to keep the company's blast furnaces in production. This is the first shipment by the company from out of Alabama.

■ WILL LIFT CONTROLS NOV. 15 ON COKE INVENTORIES

WASHINGTON—All controls will be eliminated Nov. 15 on gas production and coke inventories because of an expected early return to normal by-product coal production, Civilian Production Administration announced last week.

■ WESTINGHOUSE ENTERS HOME ELECTRIC-HEATING FIELD

PITTSBURGH—Westinghouse Electric Corp. is entering the field of electric heating for homes, an entirely new activity for the company nationally. Manufacturing headquarters will be at Emeryville, Calif.

■ CLEVELAND EMPLOYMENT REACHES NEW PEACETIME HIGH

CLEVELAND—Industry here has started on an upward swing in peacetime activity with the employment index rising 1.2 points within the last 30 days to exceed the 1929 peacetime high by 9.2 points, according to the Chamber of Commerce.

Weaknesses in Surplus Property Administration Aired by Bradley

Retiring director of Office of Surplus Property in Department of Commerce believes disposition of consumer goods can be handled more satisfactorily by Reconstruction Finance Corp., which now is assuming duties of OSP

RESIGNATION of William S. Bradley from the post of director of the Office of Surplus Property in the Department of Commerce is of more than usual interest. Ever since disposal of surplus property was set up under the Surplus Property Act there has been a continuing exodus of men appointed to key positions in the program. Some of them have given brief explanations of their actions. When William S. Clayton resigned as surplus property administrator he declared that the Surplus Property Act was unworkable. When former Senator Guy Gillette resigned the same position he told a committee of senators that he also had had trouble in trying to comply with the law.

But Mr. Bradley is the first man leaving an important post in the disposal program to tell his story in full. His troubles, as he recounted them before a gathering of the National Conference of Business Paper Editors in Washington Nov. 2, were not the result of difficulties in attempting to comply with the provisions of the Surplus Property Act. Rather, they were due to unworkable priority and pricing policies set by the Surplus Property Administration.

Questioned by the editors after his set talk, Mr. Bradley said the job of disposing of surplus consumer goods, now in process of being shifted from the Department of Commerce to the Reconstruction Finance Corp. should be performed more satisfactorily by the RFC. Being a corporation, the RFC, he said, can make most of its decisions without outside reference, it can act swiftly as, for example, in adding enough personnel to handle disposition of consumer goods.

LARGEST CANNON: This 36-inch mortar, said to be the world's largest cannon, is capable of hurling a 2-ton projectile 8 miles. Developed and built by Mesta Machine Co., Pittsburgh, it was ready to be used against the Japs when the war ended. The barrel of the mortar is 38 feet long and weighs 100 tons. NEA photo

The Department of Commerce, he explained, is dependent upon Congress for its appropriations, and the requests which it makes on the Hill may or may not be granted, and then only after much crippling delay. Further, a department such as Commerce is subject to a lot of red tape which does not handicap a corporation.

With the advent of V-J Day, Mr. Bradley said, his Office of Surplus Property had anticipated the operational and administrative problems of the disposal job that lay ahead and had developed, in co-operation with the old Surplus Property Board, a workable program.

Veterans' Provisions Unworkable

"To effectuate this program," said Mr. Bradley, "the Surplus Property Board had, at our request, revised regulation 2, implementing the priority provisions of the act, issued special orders under regulation 1, issued several exemptions and exceptions to various existing regulations and orders and had otherwise fully cooperated in the use of its authority and influence in working out problems with and between the owning agencies, the OPA and other interested government agencies and the Office of Surplus Property of the Department of Commerce.

"When Congress abolished the board and created the Surplus Property Administration it very quickly became evident that the previously existing relationship would no longer continue. This was most clearly brought into focus in the differences of opinion which developed in the revision of regulation 7, the regulation which provided certain preferences for veterans. The old regulation had been found to be unworkable, due in good part to the impracticability of the old regulation 2, through which it had to be implemented.

"But after the board had revised regulation 2 and removed the bottleneck of the 'freeze period' originally provided, the new Surplus Property Administration, within 10 days of its inception, and without carefully thinking through the problems involved, issued the revised veterans' regulation over the positive protest of the Department of Commerce. This protest arose from certain absolutely unworkable provisions of the revised regulation.

"Many of the provisions of revised regulation 7 will, in time, prove to be only a further delusion for the veteran, of which we have already had far too much."

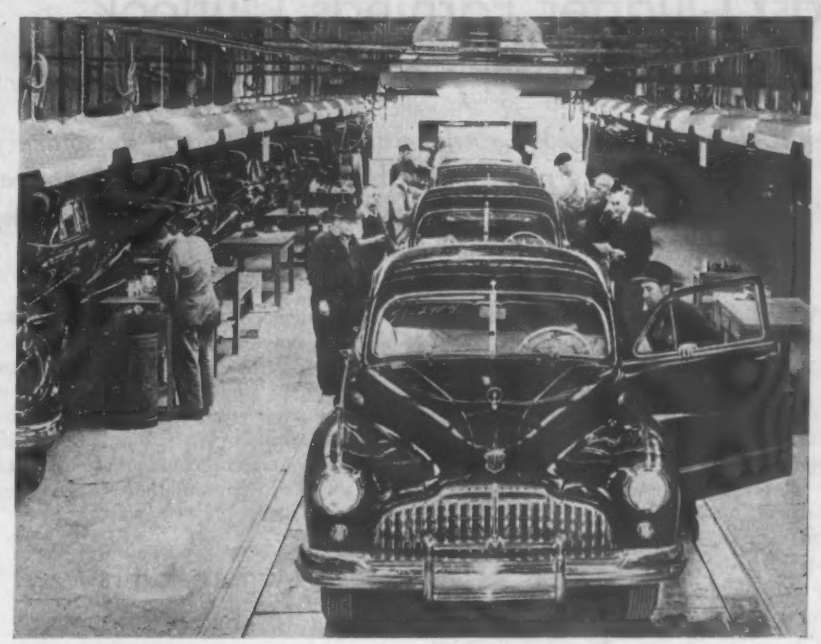
Unfortunately, continued Mr. Bradley, the divergence of views extends far beyond the matter of provision for veterans; he has found himself in disagreement with the new Surplus Property Administration on "far-reaching changes which it has insisted upon making in our pricing and sales policy.

"It should be pointed out that under the Surplus Property Administration's

(*Please turn to Page* 218)

Shortages Retarding Production

Lack of adequate component and labor supplies restricts output. Steel deliveries to be less than scheduled



ROLLING AGAIN: New Buicks are coming from the assembly lines at Flint, Mich., and production is increasing daily with 10,000 cars scheduled for November. Prewar rate of production is expected to be reached by next March when output is scheduled to total 39,000 units

MANPOWER difficulties have retarded seriously the nation's reconversion plans. Manufacturers of a wide variety of consumer goods report that their production is anywhere from 15 to 75 per cent below the level they had expected to attain in the fourth quarter. A few companies have postponed their entrance into civilian goods production until the overall situation improves.

In addition to the difficulty in obtaining workers in their own plants, due mainly to the wage rates offered, reconverting manufacturers are also adversely affected by strikes which have reduced fuel supplies and the flow of components to their plants.

The task of guiding the industrial change-over to full civilian production has been assumed by the Civilian Production Administration, successor of the War Production Board. J. D. Small, CPA administrator, said last week that his agency will use its power to expand the production of materials and items still in short supply; to limit the use of scarce materials and to restrict the accumulation of inventories so as to avoid speculation and hoarding. The new agency will also grant priority assistance to break bottlenecks, facilitate the fulfillment of relief and other essential export programs and allocate materials necessary in the production of low-priced items.

CPA has assumed its duties at a difficult time, following a coal strike which was chiefly responsible for a drop in steel production of 700,000 to 950,000 tons below previous estimates. This loss will require all manufacturers to reduce their immediate consumption of steel to insure an even distribution of the metal. Ingot production for last month was about 5,800,000 tons, according to one of the last reports issued by WPB.

Reduced operations will continue to upset planned shipping schedules and will delay deliveries of urgently needed steel products which manufacturing companies had on order. Accordingly, all manufacturers must face the fact that their steel receipts over the next 30 to 60 days will be below previous mill promises.

Steel producers have reported that they dipped heavily into their stocks of cold iron and increased their charges of scrap into the open-hearth furnaces in an effort to offset the reduced flow of hot iron caused by the banking of blast furnaces.

Although coal is moving more freely since the termination of the strike, it will require some time before coal reserves can be accumulated.

Reconversion demands have been increasing rapidly. Manufacturers of basic products have entered the market for heavy tonnages of steel to be delivered promptly. This demand is exceptionally heavy because it represents the need for repipelining as well as for current operations.

Under CPA, the former Iron and Steel Division of WPB is now known as the Iron and Steel Branch, Metals and Minerals Division. F. H. Hayes heads the division and P. J. Tracey heads the branch.

Specifications for deliveries of iron products, steel forgings, other steel items and steel alloying products are established in order M-21 which will remain in effect under CPA jurisdiction. That order also explains identification of purchase orders.

CPA inherits 51 other orders and three main priorities regulations from WPB.

Revocation of the tin order, M-43, hinges upon the availability of the ore from the Malayan peninsula and the Netherlands East Indies. Lead and antimony are two other metals still available only in limited quantities, and their respective orders, M-38 and M-112, will remain on the books temporarily.

Roughly, the controls still in effect are concerned with the distribution of scarce materials and products, their use in production and the amounts of these materials and products any one concern can hold in inventory. The overall plan is to assure, as far as possible, that these materials receive equitable distribution. The use of WPB forms for reporting will be continued.

Orders and regulations still on the books include, in part, the following: L-352, exports of automobiles and trucks; M-300, chemicals and allied products; M-384, lead chemicals; L-103, glass containers and closures; L-103-b, new glass containers and tin plate closures; M-81, cans; M-115, collapsible tubes; L-269, mining equipment; M-89, corundum ore; M-285, uranium; M-293, general scheduling order; R-1, rubber; M-63, imports of strategic materials; M-316 and M-318, coal; M-325, tinned and detinned scrap.

Mr. Small stressed recently the value of consulting with industry groups on problems of reconversion and announced that 176 key industry advisory committees will be retained. He said that these committees will be consulted before any action is taken which will materially affect production or distribution in their representative industries. Those retained under the Steel Division are: Gray Iron Foundry, Iron and Steel, Malleable Iron, Metallurgical and Operations, Steel Products.

Last Quarter Earnings Outlook In Steel Industry Not Bright

Delay of Office of Price Administration in acting on steelmakers' request for price relief makes fourth quarter of 1945 appear even less promising than previous quarter. Adjustable pricing for ingot molds and ingot mold accessories authorized

WITH steel producers' third quarter earnings reflecting a sharp shrinkage in income as a result of the termination of war demand, high production costs and frozen price ceilings, the earnings outlook for the industry in fourth quarter appears even less promising as the Office of Price Administration continues to postpone action on the steelmakers' recent request for price relief.

It had been hoped that relief would be forthcoming by this time, but as things now stand it is not certain the OPA, although favoring some increase, will authorize such until after the present question of wages has been definitely settled.

This is discouraging to producers since the request for an increase, up to $7 per ton, was based on increased wage and other costs which had accumulated prior to the present demands of the union for a $2 per day boost in pay. As a matter of fact, one large steelmaker states that if the new demands of the union are to be met an increase of around $14 per ton will be necessary.

Few upward price adjustments have been authorized on iron and steel products since the beginning of the war. Last spring a slight upward revision was permitted on certain steel products and in recent weeks an increase of 75 cents per ton was permitted on pig iron.

Adjustable Pricing Announced

Last week OPA announced adjustable pricing for ingot molds and ingot mold accessories. The action permits manufacturers to deliver these items at the present maximum prices with the understanding that any price increase authorized by OPA may be applied to deliveries made on and after Nov. 6, 1945, the effective date of today's action.

This industry breaks down its charges for ingot molds into the cost of pig iron and the cost of converting the molten iron into molds and accessories, as specified by the customer. These customers, generally, are the same customers from whom the molders bought the iron of which the molds are made.

Charges for converting iron into molds have not changed since 1937. Since the price of pig iron has been increased about $1.75 per ton, this industry is buying iron at the increased price and selling it back to the same class of customer at the 1937 rate.

Last week's action also removed ingot molds and accessories from the coverage of the gray iron castings regulation (Maximum Price Regulation 244) and placed them under the machines, parts and industrial equipment regulation (Revised Maximum Price Regulation 136). This will overcome confusion in the trade regarding which regulation covered these items.

Stove Manufacturers May Apply for Price Revisions

Manufacturers of household cooking and heating stoves, other than electric, and/or thermostats for use on such stoves may apply for price adjustments under the reconversion pricing orders of July 23 without showing that their production was curtailed by half or more from 1941 to 1945, the Office of Price Administration ruled last week.

Refractory Price Revision Provision Amended by OPA

Manufacturers of refractories now may apply to the Office of Price Administration for price adjustment when their overall operations have been conducted at a loss, regardless of whether their production is essential or low-priced.

Clayton Pricing Formula Extended on Surplus Tools

An extension of the Clayton formula for pricing government-owned standard general purpose machine tools and machinery was issued last week by the Surplus Property Administration, in the form of SPA Regulation No. 13.

Effect of the new regulation is to provide a fixed price policy for all surplus machinery and machine tools. The Clayton formula provided a depreciation pricing rate for tools with up to 36 months of active use. The new extension provides a price reduction rate for tools with up to 25 years of active use.

The percentage of original cost to be applied as selling prices range all the way from 85 per cent to 90 per cent for machines used less than one month to 15 per cent to 20 per cent for those which have been in active use 25 years. Machines used more than 25 years will be sold at current market prices, but not in excess of the 25-year price determined in accordance with the formula.

The regulation covers all metalworking machinery and represents a long-range fixed price policy. It sets price tags on virtually all government-owned metalworking equipment. A machine tool inventory recently furnished to the SPA by the owning agencies showed there was a potential surplus of approximately 700,000 items, of which approximately 340,000 items consist of "cut-a-chip" machine tools.

Price Ceilings Raised 14 Per Cent on Metal Toys

Metal toy manufacturers have been permitted to increase their previous ceiling prices by 14 per cent. Office of Price Administration has established, effective as of Nov. 2, a 14 per cent industry-wide price increase factor for all reconverting manufacturers of such items.

Producers' Council Sets High Construction Goal

Supply of steel will be sufficient to meet next year's requirements for new construction at about $7.4 billion, an increase of 60 per cent over the 1945 total.

This was the consensus of manufacturers of building materials and equipment attending the semi-annual meeting of the Producers' Council Inc., in Cleveland last week. The Council's Market Analysis Committee forecast a record-breaking volume of building during 1949-1951 when expenditures for new construction should average $15 billion a year, or more than double the average for the 20-year period preceding the war.

Chairman of the meeting, and also president of the Council, was L. C. Hart of the Johns-Manville Sales Corp., who urged industry members in every major community to co-ordinate their efforts more effectively to insure a maximum volume of building in the future.

Other principal speakers included Charles E. Young, economist, and Irving W. Clark, manager, Better Homes Department, Westinghouse Electric Corp.; S. W. Corbin, manager, Industrial Resale Division, Apparatus Department, and S. Wells Corbin, General Electric Co.; Joseph E. Merrion, president, National Association of Home Builders; John L. Haynes, chief, and William H. Shaw, chief statistician, Construction Division, Department of Commerce; George W. West, chairman, Construction and Civil Development Department, Department of Commerce; Tyler S. Rogers, Owens-Corning Fiberglas Corp.; Wilson Wright, Armstrong Cork Co.; North Wright, Libbey-Owens-Ford Glass Co.; Douglas Whitlock, Structural Clay Products Institute; Chris L. Christensen, Celotex Corp.; R. G. Creviston, Crane Co.; J. C. Bebb, Otis Elevator Co.

Progress Being Made Settling War Contracts

September completions more than double August total. Contracts pending settlement on Sept. 30 totaled 103,000

RAPID progress is being made toward settling the bulk of canceled prime war contracts by Dec. 31, 1945, according to the fifth quarterly report of Robert H. Hinckley, director of Contract Settlement. During September 2900 prime contracts were settled with cost to the government and 16,700 without cost. The total settled in September was more than twice the number settled in August, the previous record month.

This performance should now be bettered materially, because the victory over Japan caused an interruption of contract settlement in August and early September to place emphasis on the more pressing problem of effecting terminations and of reconverting to civilian production.

From the beginning of war production to date, terminated contracts have numbered 288,000 involving $62 billion. Of these, 185,000 involving over $25 billion in canceled commitments have been settled. Surrender of Japan brought termination of 113,000 prime contracts involving $24 billion. On Sept. 30 the total number of prime contracts pending settlement was 103,000 involving commitments of $37 billion. Settlements averaged about $1 billion per month during the third quarter; if contractors file their claims promptly, this rate of settlement could be increased to $4 billion or more monthly before Jan. 1, Mr. Hinckley points out.

Plants Cleared Quickly

Quick plant clearance has been possible even with mass termination, Mr. Hinckley reports. "In almost all cases," the report states, "termination inventories and government-owned plant equipment are being removed from plants within the 60 days prescribed by the Contract Settlement Act."

Only a small portion of industry's total funds is tied up in canceled contracts, Mr. Hinckley reports.

"It is estimated that the gross amount owed by government under canceled contracts is less than $3.5 billion. The amount of industry's funds actually tied up is considerably less than this, however. Partial payments and T-loans outstanding totaled $320 million. In addition, a large proportion of the $1.9 billion outstanding in other government-guaranteed loans and in advance payments is now being used to finance terminations rather than war production," he declares.

On Sept. 30, the report states, the War Department had the equivalent of 22,000 persons engaged fulltime on contract settlement work. The Navy Department had 4800 persons engaged fulltime and 1900 parttime. The Maritime Commission, Reconstruction Finance Corp., and Treasury Department had a total of 242 assigned fulltime and about 2000 persons available for parttime work.

Many contractors have expressed satisfaction with the way the job of contract settlement has been handled. Few complaints have been received. Only 21 appeals have been filed by contractors with the Appeal Board of the Office of Contract Settlement.

Chicago District Contract Terminations Speeded Up

Chicago Ordnance District made final settlement on 190 contract termination cases during the period Oct. 15 to Oct. 31. This reduces the district's backlog of unsettled cases to 712 as of the end of last month, according to Col. John Slezak, district chief.

Col. Slezak states that companies have speeded up greatly in submitting inventories and claims to the district during the recent period, and that the district now lacks only 187 inventories from contractors, compared with 373 on Oct. 15, while the number of claims yet to be received has been reduced to 282 from 488.

However, he declares that if the district is to achieve its goal of 97 per cent final settlements by the end of the year, it is imperative that the remaining inventories and claims be submitted in the immediate future.

Col. Slezak says that his organization has settled 518 termination cases since Sept. 1. Of the 712 cases still remaining to be settled, 51 are over four months old.

Machine Tool Dealers Meet In Cleveland Nov. 19-20

American Machine Tool Distributors Association will hold its annual meeting at Hotel Statler, Cleveland, Monday and Tuesday, Nov. 19 and 20.

Among the speakers will be A. G. Bryant, past-president of the association, who recently was elected second vice president of the National Machine Tool Builders' Association. Mr. Bryant, who is president of Bryant Machinery & Engineering Co., Chicago, has spent much time in Washington in the interests both of the builders and the dealers. His subject will be, "Business Retreats from Washington."

Guest speaker on the second day of the meeting will be Tell Berna, general manager, National Machine Tool Builders' Association. His subject will be, "The Machine Tool Industry from the Manufacturer's Viewpoint."

The annual dinner will be held Monday evening, with A. B. Einig, general manager, Motch & Merryweather Machinery Co., who is president of the association, presiding. Tuesday afternoon will be given over to an open forum on current problems facing members. New officers will be elected at that time.

TRANSITION TOPICS

LABOR-MANAGEMENT— Representatives of industry and unions seek ways to minimize industrial strife at Washington conference. U. S. Steel refuses to reopen wage parley until price relief is granted. See pages 89, 91.

SURPLUS STEEL PLANTS— Senate committee studies policies for disposing of government-owned units. U. S. Steel, once virtually excluded as prospective lessee or purchaser of Geneva plant, now favored by government spokesmen. See page 92.

CIVILIAN GOODS— Production of peacetime products being hampered by shortages of labor and components. See page 95.

WAGES— Commerce Department's statement that automotive wages could be increased without compensating rise in prices assailed by manufacturers. See page 105.

DESCALING STAINLESS STEEL— Sodium hydride process of descaling stainless steel may be better appreciated when it becomes known it is first pickling method with no deleterious effect on surface or structure. See page 122.

STAMPING MARVEL— A sample of potentialities of some machines going to work on commercial products is record of press producing one million stampings per 48-hour week. See page 124.

House Judiciary Committee Blesses Limit on Retroactive Pay Increases

H. R. 2788 considered one of most important "business-relief" bills submitted to Congress in years. Would protect employers from liabilities arising from arbitrary rulings and interpretations by government agencies and administrators

H. R. 2788, which would establish a statute of limitations against retroactive pay increases under numerous federal laws which do not contain a specific statute of limitations, has been approved by the powerful House Judiciary Committee. The bill is considered by many to be the most important "business relief" measure introduced in Congress in years.

The bill was introduced March 27, 1945, by Rep. John W. Grimes, Iowa, who in a series of hearings showed that many employers without warning find themselves liable for huge sums, often threatening them with bankruptcy. Liability, he showed, often comes from arbitrary interpretations and rulings by the administrators of the agencies involved.

"It is often," Mr. Grimes reported, "where a new interpretation is applied that an employer for the first time finds himself liable for large sums for past services of individuals, many of whom may no longer be in his employ, but whose right to collect can be asserted as much as 12 years later.

"A good illustration arises from the operation of the Fair Labor Standards Act. An employer who violates the provisions of this law relating to wages or hours may be subjected to suit for twice the amount involved together with costs and attorneys' fees. The application of this law has been greatly extended by administrative regulations.

"As a result an employer who may have, in good faith, relied upon a certain ruling, regulation or practice, suddenly finds himself confronted with many suits when a change is made either by the administrator or by the courts. The enforcement of this new liability dating back to the enactment of the law would in many cases bankrupt the employer."

Out of hundreds of cases, Mr. Grimes cited a few typical ones.

Some years ago, he said, the Wages and Hours administration found that cookhouse personnel in logging camps were not under the act. Three years later it reversed this opinion and ruled that employers would be required to make retroactive overtime pay adjustments to cookhouse employees.

Whereas the Wages and Hours administrator held that "travel time" of coal miners was not work time, the Supreme Court later decided it was work time. This decision had the practical effect of creating new and unforeseen contingent liabilities.

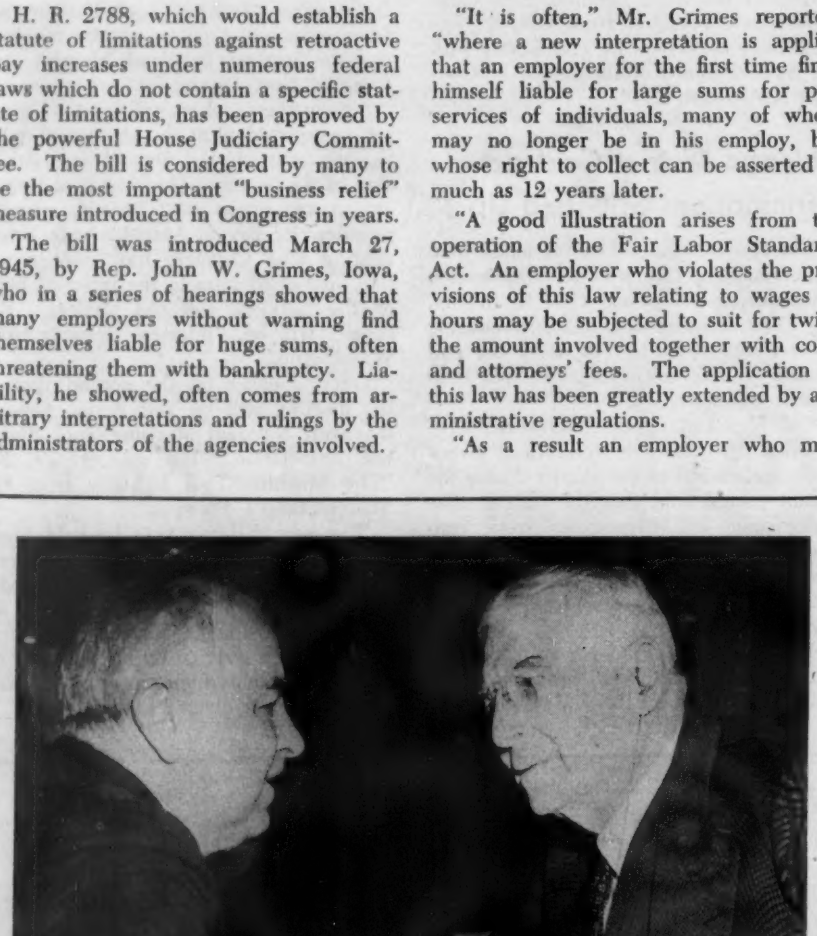
In Brooklyn Savings Bank vs. O'Neil (323 U. S. 698), the Supreme Court decided that the action given for liquidated damages under the Fair Labor Standards Act could not be waived by agreement between the employer and the employees.

"Similar instances might be pointed out of cases arising under the Public Contracts Act, the Clayton Act, the Sherman Act and many others," reported Mr. Grimes. "For example, the Supreme Court, in the case of United States vs. South-Eastern Underwriters Association (322 U. S. 538), held that insurance transactions across state lines constituted interstate commerce, thereby reversing prior decisions of 75 years' standing. Immediately such transactions became subject to the antitrust laws, and insurance companies might be subjected to suits for treble damages for doing the very things the court formerly said were lawful and which the various states in some instances actually required."

Would Benefit Small Employers

The proposed law, according to the report of Rep. Sam Hobbs (Dem., Ala.), chairman of the Judiciary Committee, will be particularly beneficial to small employers who "generally do not have the large legal staff necessary to keep them posted daily on the volume of administrative regulations, rulings, and interpretations issued by government bureaus. Volumes are published and distributed weekly. . . . Even if he could accomplish the remarkable feat of understanding and complying with all this, he would still not be safe. For without notice these rules might be changed and that which was lawful when done now becomes unlawful in retrospect."

H. R. 2788 would: 1—Require that all causes of action accruing after its enactment be commenced within one year; 2—require that all causes of action which had accrued prior to its enactment and which had not already become barred



PROPOSES SCIENCE PROGRAM: Testifying before the Senate Military Affairs and Commerce subcommittee hearing on the science program bill, Bernard Baruch, right, suggested a "science cabinet" consisting of men selected solely for the contributions they could make to the advancement of science. Mr. Baruch is pictured here with Sen. Harley M. Kilgore of West Virginia. NEA photo

CONE AUTOMATIC MACHINE COMPANY

says many

GOOD THINGS AHEAD

It is reported that . . . . . .

"Liquid Envelope" is the new commercial coating that has been used to protect fighter planes in shipment. It may be sprayed, dipped or brushed, hot or cold. *Better Finishes & Coatings, Inc., Newark, New Jersey.*

get ready with CONE for tomorrow

Three iron companies are cooperating in a joint photographic aerial survey of the Marquette Range as an aid to more detailed exploration. *Engineering & Mining Journal.*

get ready with CONE for tomorrow

A new electrical instrument is said to be so sensitive that it can measure movements as small as one ten-millionth of an inch without touching the object. *Battelle Memorial Institute.*

get ready with CONE for tomorrow

A scientific journal reports that a new type of mechanical refrigerator, employing a high-speed rotor as its only moving part, can produce temperature drops as great as 220 degrees and can, by modification, be used as a heat pump for such purposes as the heating of homes in winter. *Journal of Applied Physics.*

get ready with CONE for tomorrow

Stainless steel is being made for a black surface finish suitable for the bottoms of cooking utensils and for many applications where reflections or glaring light are a disadvantage. *Business Week.*

get ready with CONE for tomorrow

The announcement by one radio manufacturer of a new set not much larger than a package of cigarettes is expected to be followed by a rush of similar announcements by other manufacturers. *Sentinel.*

get ready with CONE for tomorrow

Prisoners of war are constructing a model of the Mississippi River drainage area to permit the study of complex problems of drainage for the co-ordination of flood control measures. *Engineering News Record.*

The Great Lakes Research Institute has been organized to do for these inland seas what the Woods Hole Oceanographic Institute has been doing for the Atlantic.

get ready with CONE for tomorrow

The Army is packing guns and other weapons and surplus material in steel or aluminum "cans", in an atmosphere of nitrogen, for storage. *Air Technical Service Command.*

get ready with CONE for tomorrow

Stainless steel can now be cut with an oxy-acetylene torch almost as easily as mild steel. *Air Reduction Sales Co., Rustless Iron & Steel Corp.*

To aid the war-to-peace reconversion of scientific research, the Senate's subcommittee on war mobilization recommends that Congress create a National Science Foundation as an independent government agency.

get ready with CONE for tomorrow

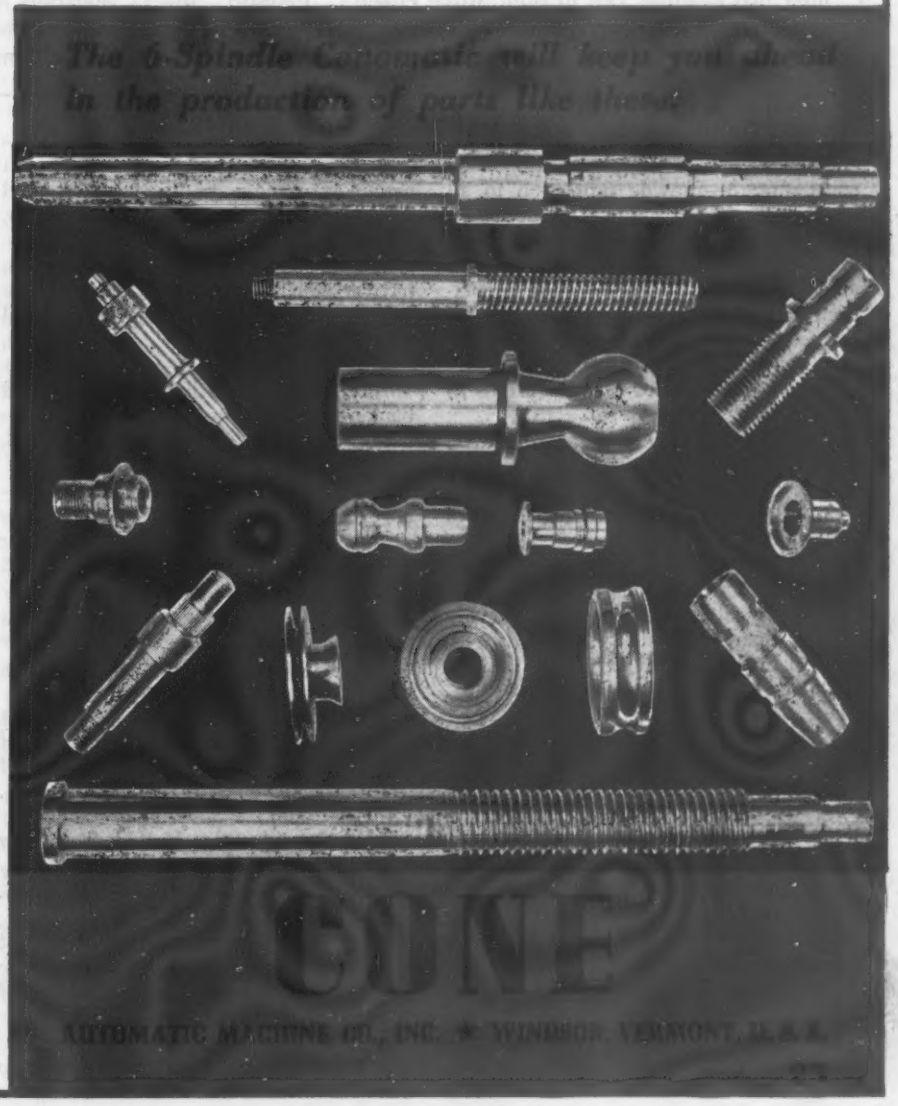
Power steering, which has been discussed speculatively for automobiles, is being used on one model of dump truck. *Heil Co.*

get ready with CONE for tomorrow

America's first jet-propelled plane is now a museum piece at the Smithsonian Institution. *Science News Letter.*

get ready with CONE for tomorrow

A new portable hardness-testing hammer is spring-operated and, being portable, can be used to test pieces of metal of any size, anywhere. *Steel City Testing Laboratory, Detroit.*


The 6-Spindle Conomatic will keep you ahead
in the production of parts like these
CONE
AUTOMATIC MACHINE CO., INC. ★ WINDSOR, VERMONT, U.S.A.

SENATE ATOMIC COMMITTEE: Newly appointed members of the Senate Atomic Committee are shown at their first meeting. Left to right, front: Edwin C. Johnson of Colorado; Millard Tydings, Maryland; Biren McMahon, Connecticut; Arthur Vandenberg, Mich. Second row: Thomas Hart, Connecticut; Eugene Millikin, Colorado; Warren Austin, Vermont; and Bourke Hickenlooper, Iowa. Members not included in photograph are Harry Byrd, Virginia; Richard B. Russell, Georgia; and Tom Connally, Texas. NEA photo

by any applicable statute of limitation be commenced within six months after such enactment; 3—provide protection to all persons who had in good faith relied upon any regulation, order, or administrative practice, notwithstanding any subsequent amending or rescinding of such regulation, order or administrative practice.

Specifically, the Grimes bill would affect causes of action for the recovery of wages, penalties or other damages as follows:

1. Suits for treble damages based on infringement of a registered trade-mark (15 U. S. Code, sec. 96).

2. Suits based on infringement of copyrights (17 U. S. Code, sec. 25).

3. Actions for treble damages against persons importing goods into the United States and selling the same systematically at less than the market value with intent to injure an industry in the United States or to create a monopoly (15 U. S. Code, sec. 72).

4. Suits for treble damages and costs including attorney fees for violation of antitrust laws (15 U. S. Code, sec. 15).

5. Actions for damages for violation of the so-called Civil Rights Statutes (8 U. S. Code, sec. 43).

6. Suits for double the amount involved plus costs and attorney fees for violation of sections of the Fair Labor Standards Act relating to minimum pay and maximum hours (29 U. S. Code, sec. 216).

7. Suits for wages due merchant seamen, plus penalties (46 U. S. Code, sec. 596).

8. Actions by the United States to recover penalties for failure to comply with certain provisions of the Packers and Stockyards Act of 1921 (7 U. S. Code, sec. 207).

9. Actions by the United States to recover penalties based on failure to file certain statements with the Federal Trade Commission (15 U. S. Code, sec. 65).

10. Suits against directors of national banking associations for knowingly violating certain banking laws (12 U. S. Code, sec 93).

11. Suits by the United States to recover penalties for failure to file certain information, documents, or reports under the Securities Exchange Act of 1938 (15 U. S. Code, sec. 78 ff.).

12. Suits to recover treble the amount of illegal fees knowingly collected by any consular officer (22 U. S. Code, sec. 92).

13. Suits by the United States for liquidated damages based on failure of any contractor to comply with terms of contract as to wages, hours, etc. (41 U. S. Code, sec. 36).

14. Suits by the United States for fixed amounts of damage under the Contract Settlement Act of 1944 (41 U. S. Code, Supp. IV, sec. 107 (d)).

15. Suits to recover penalties against registers of public lands for giving false information in regard to registering of land (43 U. S. Code, sec. 107).

16. Suit by the United States to recover penalty of $1000 per day from common carriers by water for failure to file with the United States Maritime Commission copies of certain agreements with other carriers (46 U. S. Code, sec. 814).

17. Suit for treble damages against certain carriers by water who discriminate against other carriers (46 U. S. Code, sec. 1227).

18. Suits against common carriers subject to the provisions of chapter 1 of title 49, United States Code, for violation of provisions of said chapter (title 49, sec. 8).

19. Suits brought by the United States against persons who defraud the government in connection with the disposal of surplus property (Surplus Property Act of 1944, sec. 26).

Moves To Permit Sales In Small Quantities

W. Stuart Symington, surplus property administrator, at the instance of the Senate Small Business Committee, has authorized sale of surplus government-owned consumer goods in quantities sufficiently small to provide opportunities to small business. War Assets Corp., the new RFC subsidiary organized to take over the sale of consumer goods from the Office of Surplus Property, Department of Commerce, has been called upon by the Surplus Property Administration to sell "to the extent feasible" in "sufficiently small quantities to enable small independent retailers who

normally buy direct from manufacturers to participate in such offerings."

Furthermore, the new policy calls for the establishment of a second minimum quantity which shall be applicable to the wholesale trade, and wholesale purchasers of such items should agree to use their best efforts to resell to small retail establishments unable or unwilling to buy in quantities as large as the retail minimum. Prices of surplus goods which are offered to wholesalers, according to the new policy, should be such as to compensate wholesalers for their distributive function. In establishing such prices the disposal agency should take into consideration (1) the type of goods, (2) the turnover potential, (3) the cost of care and handling, (4) the value and (5) the quantity offered.

The new policy also indicates that large retailers such as chain stores, mail order houses, and co-operative organizations which usually perform an intermediate distributive function should be permitted to buy surplus consumer goods at a discount of not more than 5 per cent from the net prices which small retailers are required to pay. In establishing prices, OPA selling prices should be taken into account.

All But 12 Antitrust Law Immunity Orders Revoked

All but 12 out of 215 antitrust law immunity certificates issued by the chairman of the War Production Board to permit wartime pooling of industrial facilities, patent rights and technical information had been revoked on Nov. 1. The outstanding certificates were issued to aid the public procurement program of Philippine hemp and copra and to aid the rubber programs.

India Relaxes Steel Import Licensing for Sterling Bloc

Less restricted licensing of steel imports, confined to purchases from the sterling countries, however, has been decided upon by the government of India.

The modification of requirements for Indian imports, it was said, is made possible by the improved supply position of the United Kingdom in certain steel items for which the Indian authorities require import licenses. The change affects United Kingdom, Australia, South Africa, and other sterling bloc sources.

Supplies covered include iron and steel wood screws, roofing bolts and nuts, galvanized roofing screws, rose head nails, light hand tacks, blue cut tacks, shoe tacks, panel pins, bifurcated and tinman rivets, stitching wire, telescopic flush pipes, iron and steel valves, steel conduits, wire netting, wire mesh, wire chains, wire linking fencing, chains, forged steel balls for the cement industry, horse and bullock shoe nails, boot protectors and washers.

Experiment To Manufacture Liquid Fuel from Farm Wastes Under Way

Department of Agriculture's research laboratory of Peoria, Ill., to test feasibility of converting corncobs into alcohol and by-products. Success may indicate large potential market for equipment, not only at home but in foreign countries

WHETHER or not a large potential market exists for equipment to manufacture liquid motor fuel from agricultural waste will be determined over the coming months at Peoria, Ill., where, at the Department of Agriculture's Northern Regional Research Laboratory, will be launched the most ambitious program of this character yet undertaken in this country. The necessary equipment has been delivered and will be placed in operation as soon as installed.

The project is covered by a special appropriation of Congress which aims at finding in the field of motor fuel a profitable way of disposing of farm wastes. Around 200 million tons of such wastes are produced each year, of which about 100 million tons are plowed back into the soil to help maintain fertility and prevent erosion. The objective is to find a use for the remaining 100 million tons.

Corncobs will be the first of these so-called waste materials to be tried out in the new plant. Later the program will be extended to include sugarcane bagasse, peanut shells, flax shives, oat hulls and cottonseed hulls and burrs. Experimental laboratory investigations by department chemists in previous years indicate that from 90 to 95 gallons of liquid motor fuel should be obtained from a ton of such wastes.

Would Yield Valuable By-products

But the project is aimed at production not only of alcohol but of valuable by-products which will lower the cost of the alcohol. These would include lignin, xylose and furfural which sell at higher prices than alcohol or dextrose. Later on, it is hoped, the range of by-products will be extended further. To this end, the program will be in the hands of approximately 15 of the best scientists at the laboratory. Initially, the new plant is to produce approximately 2000 pounds of dextrose, 1600 pounds of xylose, 1000 pounds of lignin and 200 pounds of furfural from 5500 pounds of corncobs or other waste in an eight-hour operating period.

Department of Agriculture chemists regard the outlook as promising in the light of some cost data they already have accumulated experimentally. They estimate that the total costs should be somewhere in the neighborhood of $21 for complete conversion of a ton of corncobs; this would include $6 for the corncobs, $5 for chemicals, $5 for other costs, and $5 for fixed charges. The sales value of the product, at prewar sales prices for xylose, furfural, alcohol and lignin, they figure, should be somewhere in the neighborhood of $35 to $36. That would allow a margin of $15 to $16 for sales expense and profit.

Main units of equipment include a commercial cob crusher; a pentosan hydrolizer in which the ground cobs are to be treated with hot-dilute sulphuric acid; a machine with an ingenious "dis-continuous" screw for sulphuric acid impregnation of the solid residue left after hydrolysis; also numerous other units as filters, a vacuum still, fermenters, a xylose crystallizer, etc.

The proposed research will be carried on in close co-operation with other investigations already under way at the Northern Regional Research Laboratory which, as part of its regular research program, has a large pilot plant for the conversion of carbohydrates, by fermentation, to such liquid fuels as alcohol, butanol, and acetone, as well as facilities for testing motor fuels.

The work to be done at Peoria, interested Department of Agriculture technicians believe, will not only prove helpful to our economy in permitting more complete use of farm products, but will help United States manufacturers in the development of motors for export sale. The Latin American republics, China and other countries, they believe, will want to make extensive use in the postwar era of motors using alcohol as fuel.

Filing of Claims on War Contract Terminations Lag

Contractors wishing to close their tax books for 1945 should file their claims on terminated war contracts as soon as possible, Brig. Gen. D. N. Hauseman of the Army's Readjustment Division, said recently. The commissioner of internal revenue has ruled that for all companies not on a cash basis, money received in final settlement of war work must be considered as income in the tax year that the war contracts were terminated, no matter when final payment is made. At the beginning of October, claims had been filed on only slightly more than 10 per cent of the total number of contracts pending. During September, 12,049 war contracts were settled, leaving about 65,000 more terminated contracts to be settled.

New Data Are Included in Steel Institute's Statistical Report

Details of balance sheet and income data, number of employees, hours worked and wages paid, consumption of coke by pig iron and steel producers are added. Figures on foreign production and shipments still unavailable

SEVERAL new tables are included in the thirty-third Annual Statistical Report, just published by the American Iron & Steel Institute, presenting comprehensive statistics for the industry for 1944.

One new set of tables shows details of balance sheet and income data.

Another new table shows the number of employees, hours worked and wages paid to employees who are engaged in the production and sale of iron and steel products. This shows average hourly wages rose from $0.915 in 1940 to $1.261 in 1944.

Also included for the first time are figures showing the consumption of coke by pig iron and steel producers.

As in recent years, figures on foreign production, imports and exports are lacking for the war years.

The report's figures on steel ingot capacity (average as of Jan. 1 and July 1, 1944) show capacity was increased 3,265,230 net tons over 1943 to 93,854,420 net tons annually.

(W. A. Hauck's report on Steel Expansion for War, STEEL, June 18, page 98, indicated steel ingot and castings capacity on Jan. 1, 1945, to be 95,505,280 net tons annually).

Production in 1944 was 89,641,600 net tons, 93.5 per cent of capacity, compared with 88,836,512 net tons, 98.1 per cent of capacity, in 1943.

Blast Furnace Capacity Rises

Blast furnace annual capacity for pig iron and ferroalloys increased 3,733,190 net tons to 67,921,410 tons in 1944 from 64,188,220 tons in 1943. Production rose to 62,072,683 tons or 91.4 per cent of capacity in 1944 from the 1943 figure of 61,895,314 or 96.4 per cent capacity. During 1944 the total pig iron and ferroalloys for sale was 9,505,692 net tons compared to 10,721,631 net tons in 1943.

Two blast furnaces were added in 1944, one at South Chicago, Ill., and one at Houston, Tex., adding 724,000 to annual pig iron capacity. Work was suspended during the year on two other blast furnaces with a total of 859,000 tons pig iron capacity, one at Indiana Harbor, Ind., the second at Monessen, Pa.

Abandoned or dismantled during the year were six blast furnaces aggregating 1,061,400 tons annual capacity, three at Mingo Junction, O., one at Riddlesburg, Pa., one at Sharpsville, Pa., and one at Holt, Ala. Also abandoned were a 600,000 ton bessemer steel plant at Mingo Junction, O., an open-hearth furnace of 178,000 tons capacity at St. Louis, and several rolling mills for production of rods, bars, shapes, and light rails at Allentown, Pa., Coatesville, Pa., Lebanon, Pa., Philadelphia, Cleveland, Newark, O., Syracuse, N. Y., and St. Louis.

The steel industry's total investment in 1944 was $4,471,761,987 compared to $4,502,759,774 in 1943. Earnings before dividends and interest were $208,625,053 or 4.67 per cent of investment, against $227,942,774 or 5.06 per cent for 1943. Cash dividends paid were $118,952,893 to 492,509 stockholders at year's end compared to $148,749,156 and 558,005 stockholders in 1943.

Total wages and salaries were $2,640,954,365 against $2,653,504,759 in 1943. There were 869,493 employees in Dec. 1944 compared to 958,284, highest on record, in the same period of 1943. Weekly hours averaged 46.3 in 1944 against 42.8 in 1943, and average hourly earnings were $1.261, against $1.181 in 1943.

Federal, state and local taxes were $464,996,548 against $617,119,137 in 1943.

Net billings of the industry were $6,590,505,736 in 1944 against $6,620,931,535 in 1943, and other revenues were $22,954,953, against $25,479,803 the preceding year. Current assets as of Dec. 31, 1944, were $2,587,875,855 compared to $2,497,528,745, and current liabilities were $971,203,230, against $1,054,595,037 in 1943.

Tables on facing page show the distribution of steel products to consuming industries in 1944.

Zimmerman Traces Steel Industry's Growth; Customers' Needs Stimulated Development

DEVELOPMENT of the United States steel industry since its beginning 300 years ago was traced by R. E. Zimmerman, vice president in charge of research and technology, United States Steel Corp., as part of the celebration of the golden jubilee of the automobile at the Museum of Science and Industry, Chicago, Nov. 3.

Steel, Dr. Zimmerman said, achieved its growth by helping other industries to grow. Among customer industries which increased the variety of their demands for new steel composition he mentioned the railroads, the automobile, petroleum, electrical and farm equipment manufacturers.

"In the early years of railroad transportation, the modern rail, with its toughness, strength, hardness and ability to withstand wear and heavy impacts, would have figuratively withered on the vine. Today rails represent the last word in production of fine steel. Rail steels, however, would not make the best wheels or axles or cars, because requirements of service are different."

In the beginning, the automobile used varieties of steel available at the turn of the century, Dr. Zimmerman said. Mainly these were of higher or lower carbon content, with only a few alloys. The aggressive and dynamic auto industry, however, continually demanded better steels for a multitude of parts.

"As a result," said Dr. Zimmerman, "no single enterprise in America has done more than the automotive industry to inspire the rapid development of alloy steels for mechanical purposes.

A factor which has had profound influence on progress and variety in steel, Dr. Zimmerman said, is the progressively closer association of science with industry. The early chemists, physicists and engineers generally built up a fund of knowledge which in later years provided a "sure foundation upon which to erect a usable science of metals." Metallography, almost unknown in 1890, became an indispensable standby of the steel technologist and industrial research organizations and laboratories have appeared on the scene year after year in increasing numbers.

While stainless steel of the chromium-nickel variety was patented in Germany in 1912 and Brearley, in England, brought the plain chromium stainless series to the stage of commercial production in 1913, modification of both varieties have been perfected in the United States and a noteworthy special member of the famous 18-8 chromium nickel family came into prominence in 1930 in the form of the lightweight streamlined passenger train.

Throughout the period of development in the alloy steel field, Dr. Zimmerman said, the carbon steels were the target of intensive metallurgical research because of their vast economic and technical importance. These steels have been the central theme of prolonged studies in the physical chemistry of steel making, of systematic investigations in the effects of hot and cold working and the perfection of scientific heat treatment.

ANALYSIS OF STEEL PRODUCT DISTRIBUTION IN 1944

(Source: American Iron & Steel Institute. All figures in net tons)

Classification of Billing of Products by Consuming Industries—Year 1944

(As reported by companies producing more than 95 per cent of the year's output)

Industries	Ingots, Blooms, Billets, Slabs, Tube Rounds, Sheet and Tin Bars, Etc. (1)	Heavy Structural Shapes and Steel Piling (2)	Plates (Universal and Sheared) (3)	Rails: Over 60 lbs. (4)	Rails: All Other (5)	Splice Bars, Tie Plates and Track Spikes (6)	Hot Rolled Bars: Carbon, including Hoops and Bands (7)	Hot Rolled Bars: Concrete Reinforcing (8)	Hot Rolled Bars: Alloy (9)	Cold Finished Bars (Carbon and Alloy) (10)	Pipe and Tubes (11)	Wire Rods (12)	Wire: Drawn, Nails & Staples, Barbed & Twisted, Woven Fence, Bale Ties (13)	Industries
1. Steel Converting and Processing Industries														1.
(a) Wire drawers and wire product mfrs.	120,112	5	176	.....	.....	.....	10,681	.....	10,480	3,339	−2,393	522,683	416,420	(a)
(b) Bolt, nut, and rivet manufacturers	73,043	533	1,730	.....	.....	5	570,957	.....	24,829	67,192	1,555	331,478	198,746	(b)
(c) Forging manufacturers														(c)
(1) Automotive and Aircraft	322,129	7	1,188	.....	1,254	.....	95,711	.....	217,877	2,466	557	1,356	1,075	(1)
(2) All other	1,329,920	48	44,781	.....	.....	.....	184,203	15	114,824	1,081	27,748	3,420	777	(2)
(d) All other steel plants and foundries	2,548,478	22,666	284,927	7,396	2,303	39,770	1,161,726	2,056	193,033	8,995	155,463	73,931	66,503	(d)
Total	4,393,682	23,259	332,802	7,396	3,557	39,775	2,023,478	2,071	561,043	83,073	182,950	922,870	683,521	Total
2. Jobbers, Dealers and Distributors														2.
(a) Oil and natural gas industry	4,765	2,788	7,332	.....	.....	8	2,607	53	1,780	162	549,888	.....	1,160	(a)
(b) All other	18,935	509,116	770,700	5,003	16,475	12,386	912,920	74,388	47,825	379,576	1,504,672	9,820	1,261,365	(b)
Total	23,700	511,904	778,098	5,003	16,475	12,392	915,527	74,441	49,614	379,738	2,054,560	9,820	1,262,525	Total
3. Construction Industry														3.
(a) Public (Municipal, State, National)	104	6,018	4,907	105	8	121	1,589	17,332	95	163	9,992	402	2,228	(a)
(b) Highways	3,559	53,747	30,156	.....	.....	.....	16,361	11,461	685	614	535	47	4,668	(b)
(c) Railways	104	41,634	27,165	50	3	9,120	3,421	2,778	217	45	671	315	1,273	(c)
(d) Automotive and Aircraft	167	19,105	11,009	22	8	34	6,942	1,556	1,198	713	4,942	476	1,201	(d)
(e) Utilities	5,653	27,606	43,303	1,223	9,126	446	35,236	8,715	427	266	69,318	274	9,805	(e)
(f) Bldg. trim, accessories and builders' hdw.	111	36,421	29,903	440	.....	5	43,113	12,342	505	1,131	18,396	1,087	12,055	(f)
(g) All other	34,941	593,106	642,910	17,099	7,481	5,420	245,330	222,554	12,409	4,564	198,500	13,780	129,160	(g)
Total	44,639	780,637	789,503	18,939	16,626	15,146	351,992	276,778	15,576	7,496	302,354	16,381	160,390	Total
4. Shipbuilding Industry	212,903	1,618,793	5,976,678	172	139	276	476,262	12,364	77,160	42,177	272,363	1,648	47,049	4.
5. Pressing, Forming and Stamping Industry														5.
(a) Metal furniture and office equipment	...	75	14,305	.....	.....	.....	11,170	.....	164	4,186	8,622	6,050	49,092	(a)
(b) Hardware and household equipment	22	163	4,820	.....	.....	.....	8,536	.....	277	7,154	8,745	373	22,027	(b)
(c) Automotive	20,193	9,424	145,218	.....	71	.....	281,414	.....	169,898	30,537	33,814	22,574	34,182	(c)
(d) All other	870	3,248	79,395	53	.....	.....	28,689	.....	1,900	3,468	26,660	7,289	96,563	(d)
Total	21,085	12,910	243,738	53	71	.....	329,809	.....	172,239	45,345	77,841	36,286	201,864	Total
6. Container Industry														6.
(a) Oil and natural gas industry	49,220	408	12,437	.....	.....	.....	4,517	...	627	178	37	7	1,273	(a)
(b) All other	14	193	61,964	.....	.....	.....	23,086	...	173	120	800	80	100,138	(b)
Total	49,234	601	74,401	.....	.....	.....	27,603	...	800	298	837	87	101,411	Total
7. Agricultural, Incl. Impl. & Equip. Mfrs.	10,575	33,826	56,086	.....	.....	.....	452,462	.....	38,547	67,309	26,195	10,617	40,251	7.
8. Machinery and Tools														8.
(a) Machinery and tools, not incl. elect. equip.	126,771	114,780	354,483	2,244	1,416	130	406,707	.....	81,396	143,651	189,446	8,278	25,526	(a)
(b) Electrical machinery and equipment	6,385	12,139	99,248	.....	110	72	53,036	.....	14,700	30,372	53,163	35,404	58,707	(b)
Total	133,156	126,925	453,731	2,244	1,526	202	459,743	.....	96,096	174,023	233,609	43,682	84,233	Total
9. Automotive and Aircraft Industry	135,748	55,293	238,923	.....	476	10	272,440	.....	291,423	241,485	120,694	3,286	45,755	9.
10. Railroad Industry														10.
(a) All railroads	95,400	88,019	313,271	1,967,927	15,002	773,295	232,056	.....	7,947	3,981	30,049	496	25,626	* (a)
(b) Car and loco. builders and parts mfrs.	31,195	283,957	526,902	28,362	568	16,647	248,646	.....	11,500	4,931	20,092	132	7,942	(b)
Total	126,595	371,976	840,173	1,996,289	15,570	789,942	480,702	.....	19,447	8,912	50,141	628	33,568	Total
11. Oil, Natural Gas and Mining Industry														11.
(a) Oil and natural gas, incl. pipe lines	16,861	47,789	241,722	245	18	151	25,216	.....	34,737	4,759	845,941	.....	5,705	(a)
(b) Mining, quarrying and lumbering	5,255	13,280	33,829	5,267	50,405	7,264	45,854	.....	4,727	2,256	17,157	171	6,535	(b)
Total	22,116	61,069	275,551	5,512	50,423	7,415	71,070	.....	39,464	7,015	863,098	171	12,240	Total
12. Miscellaneous Industries and Export	3,011,755	267,522	1,132,026	235,171	38,348	76,385	1,014,454	248,077	555,449	911,302	1,108,153	215,711	612,736	12.
13. Total (Items 1 to 12)	8,191,286	3,913,675	12,191,710	2,290,779	143,211	941,843	6,875,542	613,731	1,910,858	1,908,964	5,301,885	1,261,167	3,285,543	13.
14. Less Shipments to Members of the Industry for Conversion or Resale	2,406,681	724	238,151	343	1,225	20,737	855,078	21	203,799	1,270	42,382	375,390	84,601	14.
15. Net Total	5,782,605	3,912,951	11,955,559	2,290,436	141,986	920,806	6,020,464	613,710	1,713,059	1,907,694	5,259,503	885,777	3,200,852	15.

Industries	Black Plate (14)	Tin and Terne Plate (15)	Sheets and Strip: Hot Rolled (16)	Sheets and Strip: Cold Reduced (17)	Sheets and Strip: Galvanized (18)	Tool Steel Bars (19)	Wheels and Axles (20)	Skelp (21)	All Other Steel Products (22)	Total Steel Products (23)	Less Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale (24)	Net Total (25)	Industries
1. Steel Converting and Processing Industries													1.
(a) Wire drawers and wire product mfrs.	23	.....	17,850	10,971	93	157	.....	.....	355	1,111,152	469,842	641,310	(a)
(b) Bolt, nut, and rivet manufacturers	79	.....	14,708	4,875	23	41	.....	.....	....	1,270,854	135,859	1,163,995	(b)
(c) Forging manufacturers													(c)
(1) Automotive and Aircraft	...	.....	312	91	166	47	10	.....	....	644,248	47,277	596,971	(1)
(2) All other	...	.....	42,778	941	22	1,304	10	.....	...	1,751,892	194,889	1,557,003	(2)
(d) All other steel plants and foundries	4,144	398	750,872	146,237	3,978	849	1,999	686,973	261	6,162,948	4,822,685	1,640,063	(d)
Total	4,246	398	826,580	163,115	4,282	2,398	2,019	686,973	616	10,950,094	5,380,752	5,589,342	Total
2. Jobbers, Dealers and Distributors													2.
(a) Oil and natural gas industry	103	.....	128	46	72	42	.....	.....	.....	570,921	.....	570,921	(a)
(b) All other	86,339	36,902	727,555	432,505	536,948	14,370	171	.....	19,118	7,437,155	.....	7,437,155	(b)
Total	86,442	36,902	727,683	432,551	537,020	14,412	171	.....	19,118	8,008,076	.....	8,008,076	Total
3. Construction Industry													3.
(a) Public (Municipal, State, National)	...	.....	19,970	2,712	6,348	5	.....	.....	2	72,191	.....	72,191	(a)
(b) Highways	...	23	5,900	129	45,281	2	.....	.....	167	173,315	.....	173,315	(b)
(c) Railways	13	.....	481	274	45	124	.....	.....	22	87,755	.....	87,755	(c)
(d) Automotive and Aircraft	...	.....	55,078	3,588	3,490	7	.....	.....	.....	109,516	.....	109,516	(d)
(e) Utilities	...	570	16,904	1,761	90	52	3,434	.....	48	236,539	.....	236,539	(e)
(f) Bldg. trim, accessories and builders' hdw.	6,208	1,112	159,290	61,408	54,343	...	282	.....	11	438,323	.....	438,323	(f)
(g) All other	1,783	510	993,516	80,912	130,842	750	2,883	.....	926	3,336,746	.....	3,336,746	(g)
Total	8,004	2,515	1,251,139	150,216	246,429	970	8,599	.....	1,176	4,454,485	.....	4,454,485	Total
4. Shipbuilding Industry	822	927	370,553	59,783	114,705	1,033	535	.....	957	10,287,299	.....	10,287,299	4.
5. Pressing, Forming and Stamping Industry													5.
(a) Metal furniture and office equipment	1,115	1,267	26,892	30,530	5,551	.....	.....	.....	8	159,017	.....	159,017	(a)
(b) Hardware and household equipment	41,824	8,075	111,447	125,761	29,631	2	.....	.....	892	369,549	.....	369,549	(b)
(c) Automotive	8,424	18,295	354,327	145,703	11,748	1	.....	.....	...	1,285,913	.....	1,285,913	(c)
(d) All other	28,156	7,147	534,121	234,386	53,826	84	.....	.....	999	1,106,834	.....	1,106,834	(d)
Total	79,319	34,784	1,026,777	536,450	100,756	87	.....	.....	1,899	2,921,313	.....	2,921,313	Total
6. Container Industry													6.
(a) Oil and natural gas industry	7,841	33,814	232,761	54,790	2,077	20	.....	.....	.....	400,007	.....	400,007	(a)
(b) All other	305,445	1,985,033	558,493	213,752	45,894	39	.....	.....	1,060	3,296,374	.....	3,296,374	(b)
Total	313,286	2,018,847	791,254	268,542	47,971	59	.....	.....	1,060	3,696,381	.....	3,696,381	Total
7. Agricultural, Incl. Impl. & Equip. Mfrs.	792	3,967	241,726	21,187	81,642	29	.....	.....	405	1,091,708	.....	1,091,708	7.
8. Machinery and Tools													8.
(a) Machinery and tools, not incl. elect. equip.	2,193	1,948	146,625	64,999	4,281	17,970	6,215	.....	32	1,690,077	.....	1,690,077	(a)
(b) Electrical machinery and equipment	3,062	1,343	311,917	109,488	5,479	992	78	.....	331	706,226	.....	706,226	(b)
Total	5,255	3,291	458,542	174,487	9,760	18,962	6,293	.....	363	2,486,303	.....	2,486,303	Total
9. Automotive and Aircraft Industry	5,178	960	384,765	218,778	22,895	940	8	.....	41	2,039,086	.....	2,039,086	9.
10. Railroad Industry													10.
(a) All railroads	84	49	61,381	2,287	35,035	283	206,912	.....	355	3,868,455	.....	3,868,455	(a)
(b) Car and loco. builders and parts mfrs.	21	.....	179,867	8,009	7,460	259	179,853	.....	...	1,556,343	.....	1,556,343	(b)
Total	105	49	241,248	10,296	42,495	542	386,765	.....	355	5,424,798	.....	5,424,798	Total
11. Oil, Natural Gas and Mining Industry													11.
(a) Oil and natural gas, incl. pipe lines	315	581	37,238	1,789	3,567	62	47	....	112	1,296,855	...	1,296,855	(a)
(b) Mining, quarrying and lumbering	.....	61	14,417	1,175	1,815	514	1,706	.....	812	212,840	.....	212,840	(b)
Total	315	642	51,655	2,964	5,382	576	1,753	.....	924	1,479,695	.....	1,479,695	Total
12. Miscellaneous Industries and Export	105,241	487,167	1,528,695	933,094	160,221	10,765	37,309	152,216	12,177	12,874,474	.....	12,874,474	12.
13. Total (Items 1 to 12)	609,005	2,590,339	7,900,617	2,971,463	1,373,528	80,773	443,452	839,189	39,182	65,713,442	5,380,752	60,332,690	13.
14. Less Shipments to Members of the Industry for Conversion or Resale	2,106	383	486,449	30,247	3,353	169	63	607,490	.....	5,380,752	.....	.....	14.
15. Net Total	606,899	2,589,956	7,414,168	2,941,216	1,370,175	80,604	443,389	231,699	39,182	60,332,690	.....	60,332,690	15.

ONLY A BULLARD MAN-AU-TROL V.T.L. ALLOWS MANUAL OPERATION OF AN AUTOMATIC MACHINE

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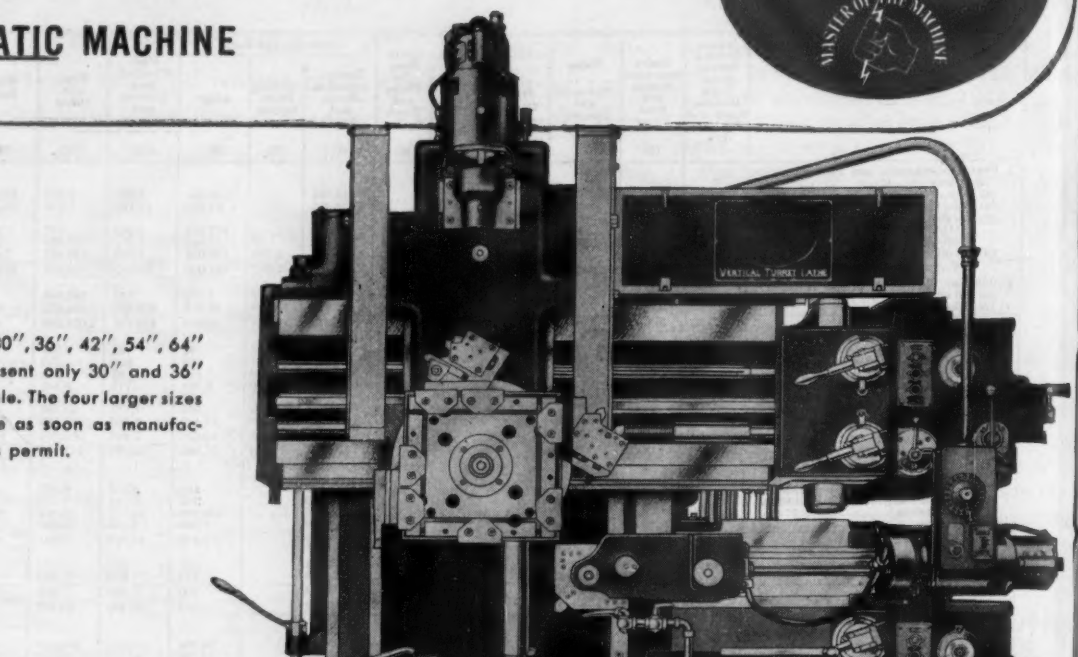
MAN-AU-TROL
MASTER OF THE MACHINE



Machine sizes: 30", 36", 42", 54", 64" and 74". At present only 30" and 36" sizes are available. The four larger sizes will be available as soon as manufacturing conditions permit.

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BULLARD CREATES *NEW METHODS* TO MAKE MACHINES DO MORE

By A. H. ALLEN *Detroit Editor, STEEL*

MIRRORS of MOTORDOM

Frankensteen defeated in Detroit mayoralty bid, despite vigorous campaign by CIO's Political Action Committee. Declaration by Wallace that automakers could raise wages without increasing prices brings sharp rebuttal

DETROIT

WITH this city's mayoralty campaign now out of the way, and the incumbent, Edward J. Jeffries Jr., elected to a fourth term by a comfortable majority of 57,594, motordom can turn its attention to other aspects of the "period of reconfusion" as George Christopher of Packard so aptly terms it. Total vote was a new record, exceeding 501,000, and was watched throughout the country as a measure of the strength of the CIO's Political Action Committee which master-minded the campaign of Richard T. Frankensteen, vice president of the UAW-CIO.

The mayor's majority was nearly double his 32,000 lead in the 1943 nonpartisan election, when he ran against the CIO-backed candidate Fitzgerald. The vote ran pretty much as predicted, coming within 0.1 per cent of a preelection poll conducted by the *Detroit News*. Negro vote, as expected, was better than 90 per cent for the union candidate, but in workingmen's districts and foreign language neighborhoods, where the PAC counted on heavy majorities, the count ran just the opposite, Jeffries leading in most of them.

All incumbent members of the city council were re-elected, one of them, Lt. George Edwards, still in the military service, being elevated to the council presidency, probably as the result of endorsement by the CIO-PAC. Two other union-backed candidates were well down the list.

Pre-election tactics of CIO strategists ran the gamut from the sordid to the ingenious. Inflammatory appeals to the negro vote, as noted, were successful, but the tops was an artful dodge to permit PAC vote checkers to determine whether the CIO membership had voted.

City Officials Squelch Trick

The latter scheme, squelched by city officials who were tipped off in advance, was to station PAC representatives at all polling places to hand placards to voters after they had voted. The placards were nothing more than a reproduction of a military discharge emblem and the words, "Welcome home." Entirely innocuous on their face and appealing to the average individual's patriotism, they were to be placed in the front window of the recipient's residence. The neat trick, however, was that their display would enable vote checker squads at once to determine whether CIO members had voted. If not, then the checkers would immediately make inquiries and take such other steps as might be necessary to get out the maximum number of their high-pressure minority group.

Meanwhile, there was more fun going on across the river in Windsor, where 11,000 UAW-CIO workers at Ford of Canada plant have been on strike since September, over nothing more than insistence on a maintenance of membership clause in their contract with the management, something which had been denied by the Canadian labor board. Last week, word came that Canadian mounted police were being sent to disperse picket lines around the plants, so union leaders at once sent out a hurry-up call for reinforcements. They proceeded to seize hundreds of private cars, trucks and buses, ejecting their occupants with threats of violence, and organized the commandeered cars into a solid ring around the plant, completely barricading it.

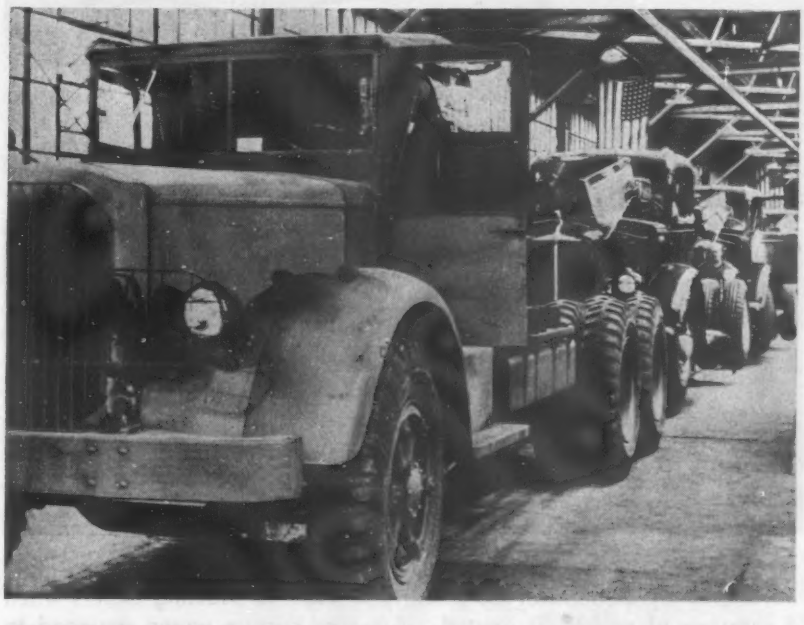
Inside the barricade, hundreds of pickets danced, sang, ate, drank and jeered, while a union sound truck whipped up their enthusiasm by music and oratory. Complaints by owners of seized cars and trucks to Windsor police brought no action, and the mayor of the city, a so-called liberal-laborite who has continuously supported the strike and fought off efforts at any official interference, hurriedly left for Toronto to "hold a conference."

Thousands of union workers in other Windsor plants left their jobs to join the fun. It was estimated something like 30,000 in all were involved, and there were threats of a general strike in sympathy which would paralyze all industry in the city.

Document released in Washington Nov. 1 by Secretary of Commerce Wallace, and purporting to be an "official study" showing why the automobile industry could raise wages 15 per cent next year and up to 25 per cent (over 1945) the two following years without having to increase prices and still earn a handsome profit, is being regarded around Detroit as typical of the fast talking and loose thinking emanating currently from government and union "experts" who in the final analysis are perhaps one and the same. These "loaded" economists reach out into the thin air and glibly talk of so many millions of dollars of sales and profits in the automotive industry over the next few years although the orders were all on the books and the production under way. Where they derive their data and by what devious processes they distort the conclusions are mysteries.

Frank Rising of the Automotive & Aviation Parts Manufacturers Inc., for example, terms the report "as fuzzy and obscure a collection of half-thoughts and nonsense as has been blazoned on the front pages for some time."

He continues, "Who are these people



COLORS CHANGED: End of World War II for Mack trucks is symbolized in this picture which shows the last Army truck rolling off the assembly line followed by the first of the civilian trucks. The dull green of the service vehicles gives way to bright colors for the civilian trucks

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who look into a crystal ball, and on a base of hazy assumptions build a set of wobbly conclusions with which to advise the President? Where did they get their data? Whom did they consult on the industrial scene? What opportunity was there for any critical study and analysis before they so arrogantly published that mass of economic tripe? Industry has an obligation to ask such questions, and to insist on complete answers."

Mr. Rising sees the next few months as decisive ones, and points upon three salient principles which practically all manufacturers will support:

1. The only way to increase the standard of living is to produce more goods and services which make up a living. Fair wages for work done is an obvious requirement, but higher wages for work not done will surely result in fewer goods and a declining general prosperity.

2. If profits are deeply cut by national design, and wages are raised by fiat, only the larger and most efficient companies can survive. The smaller firms will go to the wall, and the entrepreneur will be stillborn.

3. Not 1 per cent — much less 30 per cent — increase in wages should be given at the point of a gun and without economic justification. Down such a path lies total oblivion for a free, competitive economy.

In a more blunt tone, Mr. Christopher of Packard asks, "How can anyone expect us to go along with the President and give wage increases now on a basis that if we are not broke in six months we may possibly get some relief? Nobody can force a man in peacetime to run a business if he doesn't want to."

Mr. Christopher based his statement on a previous appeal to OPA for a price increase in service parts which was not acted upon, with the result the Packard service parts department operated at a loss of $310,000 in the first ten months of this year.

The Commerce Department report was discredited in no uncertain terms by George Romney, general manager of the Automobile Manufacturers Association in a letter to Secretary Wallace. He charged economists who had prepared the material had greatly underestimated increased costs of materials which are already well above the 1941-42 level. Tire prices, for example, are 60 per cent above the figure four years ago.

Further, parts produced from raw materials by vehicle manufacturers, entail costs which are even beyond the extent of increases in raw materials. As Mr. Romney noted, prewar quantity discounts on steel, effected largely by waiving of extra charges, are now nonexistent. Types of steel now available frequently are not of the specification best adapted to the particular manufacturing operation for which it is bought, so that higher fabricating, heat treating, and machining costs result.

In addition, some extra charges on steel are in effect now that were not in effect four years ago. Specifically, 2-inch and over steel bar, guaranteed for cold shearing, carried no extra charge before the war. Now there is an extra of $15 a ton for annealing.

Mr. Romney said the public has been grossly misled by the department's ill-advised report, and asked for the basic information and statistical material upon which government researchers based their assumptions and conclusions. He further requested that the department re-examine this whole question on the basis of available facts and information, so the report can be revised and publicized accordingly.

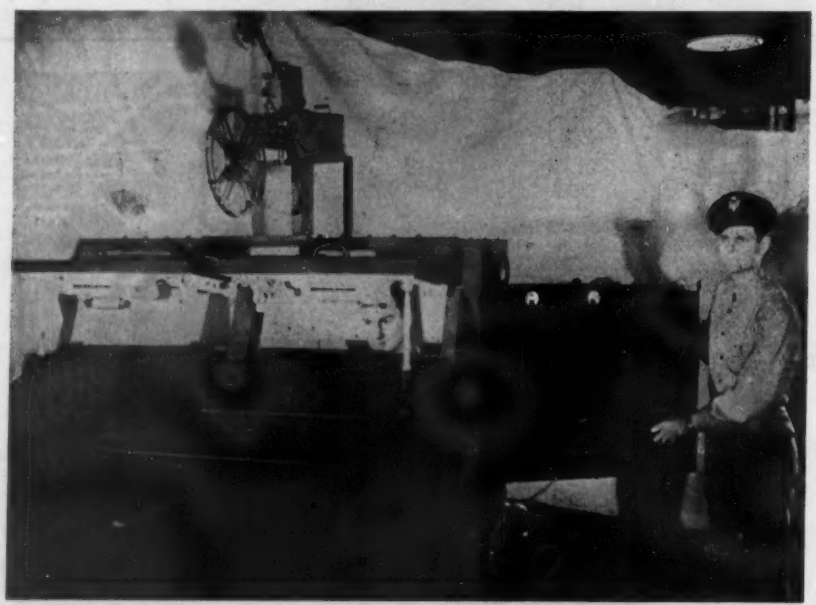
Unfortunately, appeals to logic and common sense these days are mere voices in the wilderness, nearly engulfed by the roar of publicity and indignation and breast-beating which swirls from government and unions. Sadly, too, a studied and reasonable analysis to the problem drowns in a torrent of emotional pleading, particularly when so many people are on edge emotionally after years of butchery, bullets and bombs throughout the world. If ever there were a time when level-headed and clear thinking on the part of all people was needed, it is now.

More plant construction news is contained in the announcement General Motors has acquired 175 acres of land south of Framingham, Mass., for erection of a plant to assemble Buick, Olds and Pontiac models, with expectation of breaking ground next month. The corporation has been looking for a site in the Boston area for better than a year, and has studied many locations before choosing the selected area. Plant will employ about 3000 and should be ready for assembly of 1947 models.

GM also will build a new bearing plant at Sandusky, O., presumably to be operated by either the Hyatt or New Departure Divisions.

The 52-acre Lincoln plant of Ford Motor Co. in Detroit is about ready to start assemblies. Most final lines have been installed and production of completed cars awaits only anticipations. Approximately $35 million has been expended on reconversion of this plant and on two new assembly plants to be erected in Raritan township, N. J., and in the Los Angeles area. The Lincoln war production record in retrospect includes 160,000 land and amphibious jeeps, 25,000 tank engines of the 500-hp V-8 type, 25,000 engine nacelles for B-24 bombers, 6500 center wing bulkheads for B-24s, 317,000 jeep transfer case assemblies, 560,000 jeep and military truck universal joints. The first jeep was assembled by Lincoln 11 days after Pearl Harbor and the last tank engine shipped Oct. 22, 1945.

Ford assemblies of passenger cars are pushing up to a rate of 2000 daily, with October totals close to 6500 passenger units and 8300 trucks.



SECRET TRAINER: Student is shown seated in this imitation Army tank developed by Studebaker Corp. early in 1942 for training drivers when a shortage of real tanks existed. A motion picture screen designed to show pictures of different types of terrain faced the driver. While the film was being shown a dynometer increased or decreased loads on the engine in accordance with grades shown. Students were enabled to familiarize themselves with the controls and most efficient use of power before graduating into a genuine tank. NEA photo

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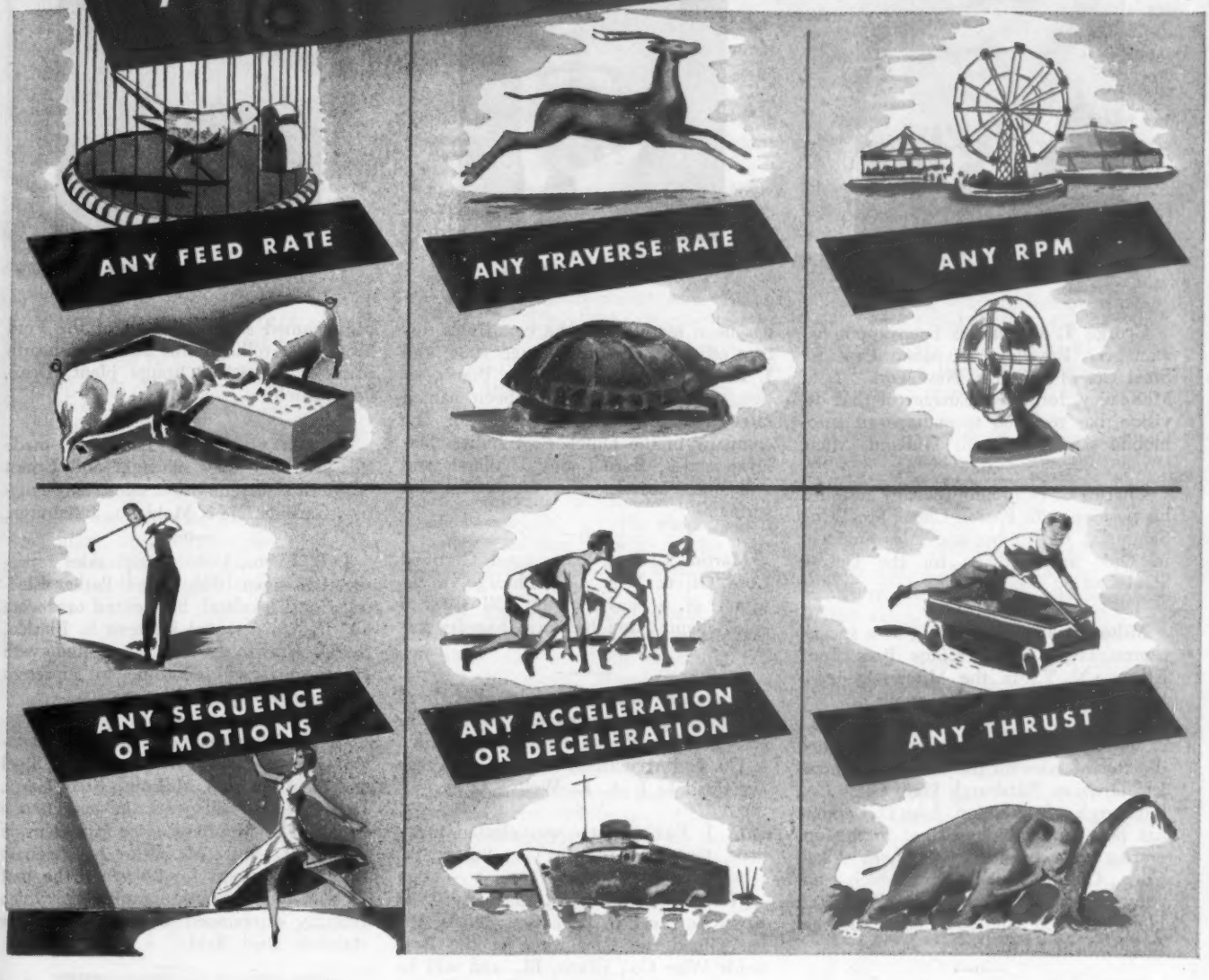

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MEN of INDUSTRY

GEORGE T. FRASER

MARTIN S. BURG

WILLIAM C. UECKER

George T. Fraser has been appointed manager, Raxalloy Division, Crucible Steel Co. of America, New York. **I. S. McReavey,** formerly manager of that division, has resigned to manage an automobile sales agency at Midland, Mich.

—o—

Charles C. Hottmann recently resigned his position with Farrell-Cheek Steel Co., Sandusky, O., to become sales engineer in Ohio and Indiana for the Detroit Steel Casting Co., Detroit.

—o—

Milton Granquist is acting as a special representative for Hardinge Bros. Inc., Elmira, N. Y., in the Minnesota territory, with office in Minneapolis.

—o—

Harry W. Gleichert has been named director of sales for the Columbia Chemical Division, Pittsburgh Plate Glass Co., Pittsburgh. In addition, **John C. Leppart** has been appointed assistant to the operating vice president, Southern Alkali Corp., Corpus Christi, Tex., which company is owned jointly by Pittsburgh Plate Glass Co., and American Cyanamid & Chemical Corp.

—o—

William L. Burgoyne has been appointed special field engineer, Federal Products Corp., Providence, R. I. Previously he was assistant to the general manager, Wright Aeronautical Corp., Paterson, N. J.

—o—

Charles W. Stewart has been appointed vice president in charge of sales, Clark Mfg. Co., Cleveland. Mr. Stewart has served as president of the Steam Heating Equipment Manufacturers Association since 1942 and for 19 years was associated with Hoffman Specialty Co., Indianapolis.

—o—

G. V. Woody has been appointed to succeed **R. C. Newhouse** as manager, basic industries department, Allis-Chalmers Mfg. Co., Milwaukee. Mr. Newhouse, who will be retained as a consulting engineer, retires after more than 40 years with the company. Mr. Woody has been manager of the company's district office at Pittsburgh since 1934, and **J. K. Keogh** succeeds him in that position. **M. M. Tulloch** has been named sales and consulting engineer for the company in the Dutch East Indies, Malayan states, Burma and Thailand, and will open an office in Singapore next spring.

—o—

Martin S. Burg has joined Certified Core Oil & Mfg. Co., Chicago, a division of Socony-Vacuum Oil Co., as chief chemist and technical foundry adviser.

—o—

Brigadier Arthur Levesley has been appointed general manager, steel foundry and ancillary departments, Edgar Allen & Co. Ltd., Sheffield, England, succeeding the late **J. A. E. Wells.**

—o—

D. J. Fox recently was elected president, Fretz-Moon Tube Co., Butler, Pa.

—o—

Norman J. Froelich, formerly with Keystone Steel & Wire Co., Peoria, Ill., has joined the sales force of the Reynolds Wire Co., Dixon, Ill., and will be in charge of its Chicago office. During the war, Mr. Froelich served more than a year with the wire branch of the Steel Division, War Production Board, Washington. **H. Allen Sisson,** formerly with Michigan Wire Cloth Co., Detroit, also has joined the sales staff of the Reynolds company, and will be in charge of its Detroit office.

—o—

D. A. Nabb has joined the sales staff of Detroit Seamless Steel Tubes Co., Detroit, after serving four years as major in the Office of Chief of Ordnance, Washington. Prior to that he was associated with Ford Motor Co., Dearborn, Mich.

—o—

James K. Sutherland, for 32 years associated with Youngstown Sheet & Tube Co., Youngstown, and recently general manager of the Great Lakes Steel Corp. plant in Ecorse, Mich., has been named superintendent of the Ford Motor Co. rolling mills and open-hearth plant at the River Rouge plant, Dearborn, Mich.

—o—

William C. Uecker has been made treasurer and sales manager and **Ernest G. Merlin,** secretary and sales representative, Carbide Die & Mold Co., Pittsburgh.

—o—

J. P. Lyons, Ohio district sales representative since 1920, Elwell-Parker Electric Co., Cleveland, has retired to devote his time to personal interests in Florida. **R. F. Crawford,** long associated with Mr. Lyons, will continue to represent the company in Ohio.

—o—

C. E. Riley has been appointed general sales manager of the Carbon Steel and Strip Division, McLouth Steel Corp., Detroit, and will work in conjunction with **L. E. Moultane,** vice president in charge of sales. Mr. Riley has been in the steel business for 25 years, the past 14 with the McLouth organization, which recently announced its entry into the stainless steel field.

—o—

Charles Schenck, engineer of development, Bethlehem Steel Co., Bethlehem, Pa., retired Oct. 31. Mr. Schenck joined the company in 1918 as production engineer at the Bethlehem, Pa. plant where he was in charge of planning, estimating cost of machinery, and piece work. He remained in that position until 1934 when he was appointed engineer of development, development and research department, on special equipment, and consultant on manufacturing and welding.

—o—

T. A. Crawford has been appointed general manager, Timken Silent Automatic Division, Timken-Detroit Axle Co., Detroit.

—o—

Benjamin Schwartz, executive vice president, New York Commodities Corp., was re-elected president, New York chapter of the Institute of Scrap Iron & Steel Inc., at its recent annual meeting.

Mr. Schwartz formerly was director general of the national institute and also was chief, Scrap Metals Section, Foreign Economic Administration, Washington. **Samuel H. Bassow,** Bassow Bros., Bronx, was elected chairman of the chapter's executive committee. Other officers elected include: First vice president, **William Frost,** P. W. Bowers Co., New York; second vice president, **Charles J. King,** Scrap Iron & Steel Corp., Brooklyn; treasurer, **George Alper,** Queensboro Structural Steel Co.; secretary, **Albert Raphael,** Bassow Bros.

—o—

George O. Boomer has been elected president, Tube Turns Inc., Louisville, Ky., succeeding **Rudy E. Fritsch** who resigned early in October. Mr. Fritsch will remain with the company as a consultant.

—o—

Paul C. Van Cleave has been appointed manager of rolled products sales, Colorado Fuel & Iron Corp., Denver, returning from the Army Air Corps where he served as major with the assistant chief of air training staff, Washington.

—o—

Carl J. Dinic has been appointed executive assistant to the president, American Locomotive Co., New York. Prior to joining the company in 1943, Mr. Dinic had served with the United States Steel Corp. and Eastern Gas & Fuel Associates.

—o—

Tin Mill Products Corp., Pittsburgh, announces the following new district sales representative: **J. A. Wilson,** J. A. Wilson Metal Products Co., New York; **C. C. Abbott,** Cincinnati; **M. J. Dennin Jr.,** M. J. Dennin & Sons, Indianapolis; **Larry W. Masters,** Toledo, O.; and **Fred A. Wade,** Detroit. **C. A. Wright,** Industrial Metals & Products Co., Erie, Pa., has been appointed area sales representative and will direct activities of **William G. Walker,** Syracuse, N. Y., **Stanley N. Olmstead Jr.,** Jamestown, N. Y., **Donald M. Hester,** Erie, Pa., **Edward R. Jones,** Rochester, N. Y., **A. H. Loranger** and **J. C. Piel,** Cleveland, **Dwight Ely,** Columbus, O., and **Hal J. Imhoff,** Shelby, O. **John W. Taylor,** formerly in charge of steel redistribution for the War Production Board, at Pittsburgh, has been appointed to the company general sales staff.

—o—

H. J. Crichton, former supervisor of purchases, General Motors Truck & Coach Division, Pontiac, Mich., General Motors Corp., has been transferred to the administrative staff of the division to handle special assignments. **R. E. Hopps,** until recently purchasing agent, succeeds Mr. Crichton. **J. T. McManus,** buyer, becomes purchasing agent.

—o—

C. G. Allen has been named to the research and development staff, Bryant Heater Co., Cleveland. Formerly associated with American Stove Co., St. Louis, and later with the testing laboratories, American Gas Association, Mr. Allen has served in the armed forces since 1941.

—o—

Hugh Avery has been named personnel director of Robins Conveyors Inc., Passaic, N. J. He recently was in charge of employment at the Lake Erie Engineering Corp., Buffalo.

—o—

Bert Carpenter, Birmingham, Mich., has been named sales representative for Michigan and northern Ohio for the Plan-O-Mill Corp., Hazel Park, Mich.

—o—

Peter F. McNeish has been appointed manager of accounting for the central district, Westinghouse Electric Corp., Pittsburgh. He succeeds **Michael J. Simica,** who recently joined the Office Methods Division, Pittsburgh, as assistant director. **Dr. Russell A. Nielsen,** formerly a research engineer at East Pittsburgh, Pa., heads the new Pacific coast high frequency laboratory opened recently by Westinghouse. **Paul W. Kohler** has been appointed manager of advertising and sales promotion for the company's Appliance Division. **E. W. Isenhower** is manager, southern California district, Home Radio Division, and has headquarters in Los Angeles.

—o—

Joseph N. Greene, president, Alabama Gas Co., and Alabama Natural Gas Corp., Birmingham, has been elected a director of the American Gas Association.

—o—

Robert G. Allen has been named general sales manager, Baldwin Locomotive Works, Eddystone, Pa. After serving more than two years in the armed forces, Mr. Allen joined the Baldwin organization in March, 1945, as general manager, Baldwin Southwark Division.

—o—

Edward M. Whiting has been elected president, Pheoll Mfg. Co., Chicago, succeeding the late **Mason Phelps.** Mr. Whiting has been vice president since 1926 and a director since 1916.

—o—

Charles F. Cushing has been appointed vice president and assistant general manager, Payne Furnace Co., Beverly Hills, Calif., a member company of Dresser Industries. Mr. Cushing leaves the post of distribution manager, Bryant Heater Co., Cleveland, another Dresser company, with whom he has been associated since 1935.

—o—

Fred J. Schmidt, formerly chief marine engineer, Pennsylvania Shipyards Inc., Beaumont, Tex., has been named chief engineer, American Steel Dredge Co., Ft. Wayne, Ind.

—o—

James Ogier Lewis, a petroleum engineer of Houston, Tex., has been named the recipient of the Anthony F. Lucas gold medal for 1946, which is awarded by the American Institute of Mining and Metallurgical Engineers. The medal will be presented at the annual meeting of

G. G. LANDIS

Who has been named vice president in charge of engineering, Lincoln Electric Co., Cleveland, noted in STEEL, Oct. 29 issue, p. 89.

C. H. MORSE III

Who recently has been elected vice president, Fairbanks, Morse & Co., Chicago, as noted in STEEL, Nov. 5 issue, p. 114.

CARL E. BARTZ

Recently named manager, Syracuse, N. Y. branch, Edgar T. Ward's Sons Co., Pittsburgh, noted in STEEL, Nov. 5 issue, p. 114.

the institute to be held in Chicago in February, 1946.

—o—

John P. Faver has been appointed assistant to the general manager and consulting engineer, Ransome Machinery Co., Dunellen, N. J. **J. E. Bushnell** has been promoted to chief engineer and **George W. Cronk** to chief draftsman.

—o—

James C. Magee has been named manager of the machinery department, Iron & Steel Products Inc., Chicago. **Charles A. Marshall** has been appointed sales engineer.

—o—

James M. Hait, Los Angeles, and **William DeBack,** San Jose, Calif., have accepted executive positions with Food Machinery Corp., San Jose, replacing **A. R. Thompson,** formerly chief engineer, and **F. L. Burrell,** who have retired. Mr. Hait becomes director of engineering and Mr. DeBack was named manager of the Anderson-Barngrover Division.

—o—

Alex Marks, formerly of the sales engineering department in Chicago, Otis Elevator Co., has been appointed general sales manager succeeding **Arthur Lundeen,** vice president and general zone manager at Chicago.

—o—

Tally W. Piper, who has been associated with Stone & Webster Engineering Corp., New York, for 25 years, has resigned as personnel and labor relations manager to establish the Unistrut Service Co. of the Southeast with offices in Birmingham and Atlanta.

—o—

Dr. Edward U. Condon has been nominated to be director of the National Bureau of Standards, to succeed **Dr. Lyman J. Briggs.** Dr. Condon has been serving as an associate director of the research laboratory, Westinghouse Electric Corp., Pittsburgh.

J. A. DOYLE JR.

Who recently became president, Wm. G. Wetherall Inc., Baltimore, noted in STEEL, Oct. 29 issue, p. 97.

—o—

Lester H. Pillion has been appointed eastern sales manager for the Precision Castings Co. Inc., Fayetteville N. Y., and he will have headquarters in New York. **A. G. Bryan** continues as metropolitan area representative. **Ross W. Castle** has been appointed western sales manager with offices at the Cleveland plant. **W. A. Maher** and **W. C. Berry,** with headquarters in Detroit, continue to serve as Michigan representatives. **H. L. Hess** continues to represent the company in eastern Pennsylvania and western New Jersey. **J. J. Punke** has been appointed factories manager and chief engineer; **Albert Lintel** will assist him at the Syracuse and Fayetteville, N. Y., plants as factory manager. **J. R. Millspaugh** has been appointed general manager of the Cleveland plant and **A. D. Weigolt,** factory manager. **Stanley Frost** has been appointed president, Kalamazoo Division, and **C. M. Hyde,** vice president and general manager.

—o—

Marcus M. Chapman has been appointed manager of sales, Sheet Division, Carnegie-Illinois Steel Corp., Pittsburgh, succeeding **Howard V. Clark,** recently resigned. Mr. Chapman first joined the United States Steel Corp. in 1919 when he served in the open hearth department of the American Sheet & Tin Plate Co.

—o—

T. H. McGraw Jr., has discontinued his services as general manager with Braeburn Alloy Steel Corp., Braeburn, Pa. From 1926 until 1944 when the company was sold to Continental Industries Inc., New York, Mr. McGraw had served as president and chairman of the board.

—o—

Dr. Charles H. Herty Jr., assistant to vice president, Bethlehem Steel Co., Bethlehem, Pa., was elected president of the American Society for Metals at the annual meeting of the society held Nov. 2 in Cleveland. He succeeds **Dr. Kent R. Van Horn,** assistant manager, Cleveland Research Division, Aluminum Co. of America. Other officers elected are: Vice president, **A. L. Boegehold,** head of the metallurgy department, Research Laboratories Division, General Motors Corp., Detroit; treasurer, **Dr. H. K. Work,** manager of research and development, Jones & Laughlin Steel Corp., Pittsburgh; **John Chipman,** professor of metallurgy, Massachusetts Institute of Technology, Cambridge, Mass., and **W. E. Jominy,** chief metallurgist, Dodge Chicago plant, Chrysler Corp., Detroit, trustees.

OBITUARIES . . .

William E. Kane, 79, president and founder, Kane & Roach Inc., Syracuse, N. Y., died recently in that city. Mr. Kane was widely known as the inventor of numerous devices, one of which was a cold roll forming machine for the steel industry.

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Clyde A. Walb, 67, president, American Steel Dredge Co., Ft. Wayne, Ind., American Steel Supply Corp. and General Dredging Co. Inc., died Oct. 30.

—o—

George F. Dort, 60, engineer in the Standards Division, White Motor Co., Cleveland, died Oct. 30 while on a business trip to Detroit.

—o—

Elbert Rodgers, president, Elbert Rodgers Coal Corp., Buffalo, and at one time traffic manager and later purchasing agent, Wickwire Spencer Steel Co., New York, died Oct. 28 in Buffalo.

—o—

Andrew Allen, owner, A. Allen & Son, Harrison, N. J., died Nov. 3 at his home in Jersey City, N. J.

—o—

Frank L. Stearns, 85, retired manufacturer of irrigation machinery, died recently in Los Angeles.

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Frank A. Moeschl, 72, a former executive of the Newport Rolling Mill Co., Newport, Ky., died Oct. 28.

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John Gibb, 41, an electrical engineer for Westinghouse Electric Corp. at Newark, N. J., died Nov. 2 at his home in Elizabeth, N. J.

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Grant Fersen Davis, 55, an executive of the Standard Steel Corp., Los Angeles, died recently.

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Jesse R. Lovejoy, 82, a director of General Electric Co., Schenectady, N. Y., since 1922 and an honorary vice president for the past 16 years, died Oct. 31 in that city.

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Henry Zschech, president in 1926, Atkins Pioneer Club, E. C. Atkins & Co., Indianapolis, died recently. He had been employed by that company for 55 years, retiring in 1943 due to failing health.

—o—

Pierre A. Cady, laboratory manager of the Passaic, N. J., branch, Rubber Manufacturing Division, Raybestos-Manhattan Inc., died recently.

—o—

W. C. Williams Jr., 61, vice president in charge of Accessories Division, General Motors Corp., Detroit, died in that city Nov. 2.

—o—

Harley S. Griner, 46, manager of the research department, J. D. Adams Mfg. Co., Indianapolis, died Nov. 4 as a result of injuries sustained in an accident.

Workers Passing Up Thousands of Job Openings

Compensation claims increase in California despite 28,000 unfilled positions. Employers more exacting in their hiring

SAN FRANCISCO

NEARLY three months after V-J Day it is estimated demand for workers exceeds the manpower supply by at least 75,000.

Of this number nearly 28,000 unfilled jobs are in the files of the United States Employment Service. The remainder can only be estimated because most of it is scattered among various union hiring halls and private employment agencies.

Charles F. B. Roeth, acting state director, USES for northern California, states although job openings are more numerous than last month by a few hundred, increases in work opportunities which would reflect an active conversion of production of civilian goods and services actually have been slight. Gains have been largely confined to government installations and to shipbuilding where the approaching contract completion dates are forcing replacement of many separated workers, particularly those in the skilled trades. Unfilled jobs on file in USES offices have decreased in number during the past month in construction, transportation and service, but openings in wholesale and retail trade have increased slightly.

Openings on file reflect more exacting specifications on the part of employers and it is evident that the number of jobs with wage rates comparable to those paid by war industries has decreased since the end of the war.

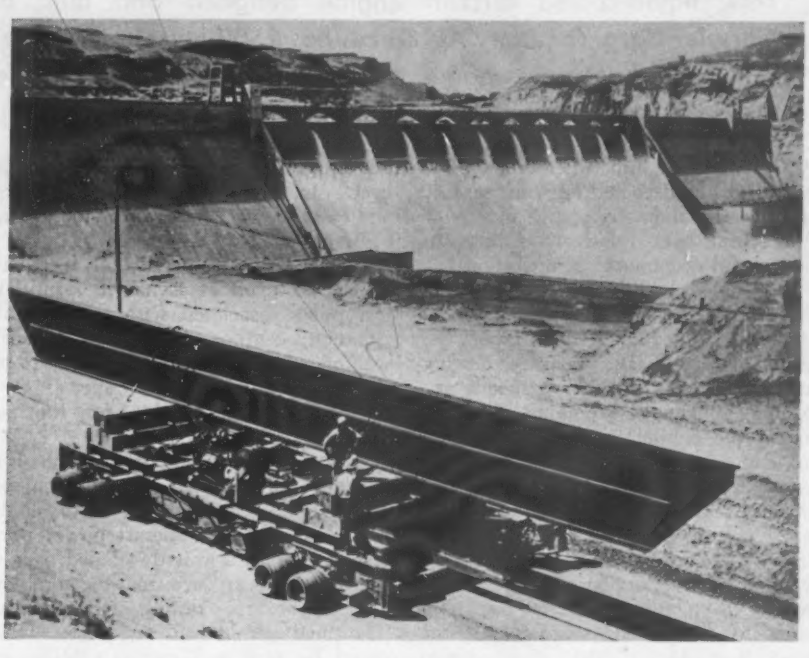
Demand Rises for Skilled Workers

Of the approximate 28,000 unfilled jobs on file in Mr. Roeth's office, more than 1300 are for professional and managerial workers, more than 8400 in clerical and sales occupations and about 3100 in the service occupations. The need for skilled workers has increased steadily to a current total of nearly 5100. Unfilled jobs for semiskilled workers are declining and now stand at about 1700. Unskilled worker openings also have been reduced to about 8000.

Despite the fact that there are jobs going begging, the number of claims for unemployment compensation has been increasing steadily. Newly unemployed workers in the San Francisco area have been filing initial claims at the rate of three to four thousand a week since the middle of August. The turnover in the newly unemployed group remains high, about a third failing to return to certify completion of the first week of unemployment. The number of persons unemployed and drawing insurance has, however, gained steadily, averaging nearly 7400 a week in September, an increase of 4200 over August. By mid-October the number had reached approximately 15,000 a week.

Unemployment insurance payments in the area are expected to increase over the next few months, but benefit payments at present are below prewar levels while the number of persons with earnings enabling them to claim benefits when unemployed has increased greatly during the war years.

Although sharp reductions were recorded in the iron and steel and machinery industries in the few weeks after end of the war, the contraction in the shipbuilding industry was the largest cause of the decline. Wage earners in the San Francisco area's shipbuilding yards declined to 50,500 in September compared with 79,000 in August and with 185,200 in the peak month of June, 1943. Further declines are indicated for October. These sharp reductions have been in private yards, as the employment in government ship repair bases has been reduced only moderately.



GRAND COULEE DREDGE: Accumulations of silt and debris at the bottom of the Grand Coulee spillway will be removed by specially constructed dredging machinery. The 43-ton steel beam, shown here on a 16-wheel trailer, is a part of the special dredge. International News photo

Los Angeles Activity Higher Than in 1944

LOS ANGELES

General business activity in Southern California is about 7 per cent ahead of last year even though war contract cancellations have affected proportionately more industries than any other industrial region in the country.

This finding, announced last week by the industrial department of the Chamber of Commerce, is interpreted by business and government officials that reconversion is moving ahead.

Purchasing agents reported to the Chamber that rising demand for goods by discharged military service personnel is offsetting decreases in sales to former war workers.

In many lines, civilian business now exceeds military cancellations and the trend is growing.

Midwest Companies Plan West Coast Branches

LOS ANGELES

Ball Bros. Co., Muncie, Ind., manufacturer of glass containers, will build a $3,500,000 factory at El Monte, Calif.

Electric Household Utilities Co., Chicago, plans a $1 million plant in the same area.

The Ball company plans to employ about 300 persons at the beginning of operations. Their plant at Valley Boulevard and Arden Drive will start with a 100,000 square-foot unit.

Electric Household Utilities Co., maker of washing machines and other appliances, has purchased a 10-acre site with 600-foot frontage on Valley Boulevard. The plant will employ 200 to 250 persons.

WING TIPS

New liquid-cooled aircraft engine designed and built by Chrysler Corp. for Army Air Forces has 2500 horsepower, more powerful than any engine of similar displacement. Drives specially adapted testing plane at more than 500 miles an hour

A NEW and hitherto secret 2500-horsepower liquid-cooled airplane engine, more powerful than any engine of similar displacement, yet relatively simple to produce and economical in operation has been designed and built for the Army Air Forces by Chrysler Corp., Detroit.

A 16-cylinder inverted-V type, the engine in a specially adapted testing plane has already developed speeds approaching 500 mph. Weighing but 2430 pounds, the engine is 10 feet 5 inches long and less than 3 feet in diameter. The small frontal area allows good visibility and affords streamlining which greatly reduces drag in flight.

The first engine was delivered to the Air Technical Service Command in January, 56 months from the designing boards to a finished product. In the period from May, 1940, when design studies began, a total of 312 designers, engineers and technicians conceived and produced more than 1100 different parts for the engine. Each part was individually and collectively subjected to every conceivable test known to both the automotive and aircraft engineering world.

In that 56-month period more than 25,000 hours of testing were devoted to the engine and its parts and assemblies, and more than 1000 engineering reports comprising 15 million words were written about it by engineers and testers. Included in the program was the construction of a propeller test house and an aircraft engine test house adjoining the Chrysler engineering division in Detroit. Inside the buildings is research and test equipment worth more than $1,500,000.

Flight tests up to 30,000 feet have been conducted at Evansville, Ind., by test pilots associated with the Republic Aviation Corp. Chrysler technicians worked with Republic engineers to redesign and rebuild a special P-47 Thunderbolt fighter ship for the new engine.

Engineers planned the engine from its inception for mass production, applying the technique of auto engine design to the new aricraft power plant. Each part, as it was developed, was reviewed with an eye for the problems that might arise during its production. The final result was an engine which could be produced easily, quickly, and with maximum economy in production, operation and servicing.

Major features of the engine are:

Small frontal area, permitting better visibility for the pilot and allowing submerged installations in the wing or fuselage and more compact cowling installation, thus reducing drag. In bomber types of planes slender engines can be submerged in wings, practically eliminating drag.

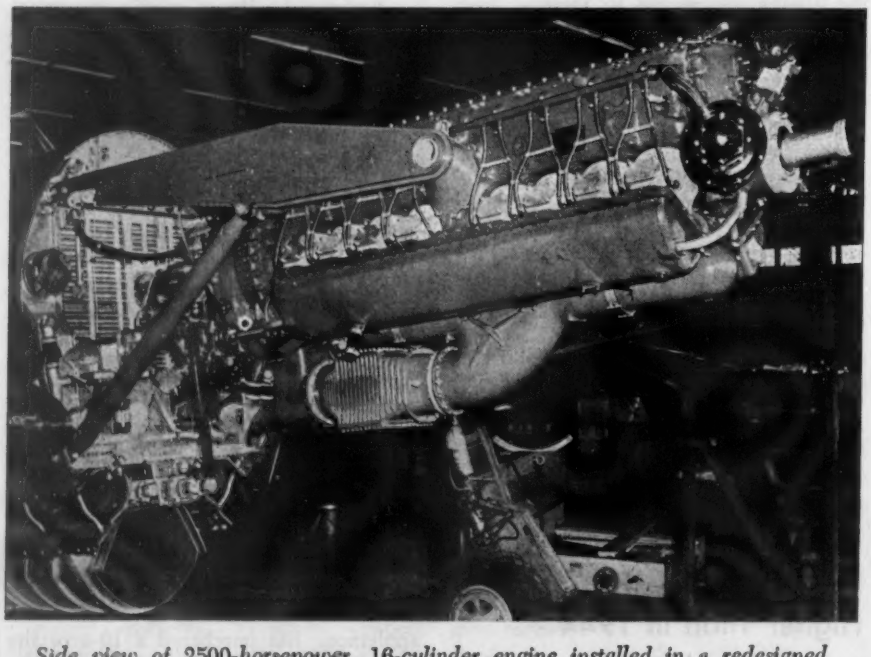
Use of a two-piece crankshaft, bolted together at the reduction gear pinion, reducing vibration and simplifying production, assembly and servicing.

Use of two valves to a cylinder, reducing weight and allowing better cylinder breathing and strong cylinder heads.

A one-piece crankcase, simply machined and easily installed.

A single large ring nut and washer to fasten the cylinder and barrel to the crankcase.

Accessories and fittings placed in accessible places to simplify production and servicing. The valve gear, for example, is reached in the new engine simply by removing a cam box cover.



Side view of 2500-horsepower, 16-cylinder engine installed in a redesigned Republic P-47 fighter plane. The narrow diameter of the engine provides good visibility for pilot and reduces drag

Kaiser Plans Experimental Work on New Hiller-Copter

Kaiser Cargo Inc. announced last week that further experimental and development work on the Hiller-Copter invented by Stanley Hiller Jr., Berkeley, Calif., will be carried on by the company's engineering forces at its Fleetwings Division aircraft plant in Bristol, Pa.

Mr. Hiller, because of his interest in Hiller Industries and other business enterprises located in the Bay area, preferred not to go to Bristol to perform further services for Kaiser Cargo Inc. and is therefore no longer connected with the Kaiser interests in any way. He will remain in the San Francisco Bay area to direct his own organization, United Helicopters Inc., which will independently conduct development and production of rotary wing aircraft. Neither Mr. Kaiser nor Kaiser Cargo Inc. has any financial or other interest in this new company. Kaiser Cargo Inc. retains its rights, under Mr. Hiller's original patents on the Hiller-Copter, as well as helicopter inventions made by Mr. Hiller while performing services for that company.

The Hiller-Copter employs a pair of co-axial, contra-rotating wings, and made its initial flight on May 14, 1944. The Hiller-Copter's two rotors, operating on a common axis, eliminate the necessity for the tail rotor employed by conventional single-rotor helicopters to counteract torque, thereby increasing the amount of power available for lift and forward propulsion.

Five Overseas Surplus Airplanes Are Sold

Five overseas surplus airplanes were sold and another leased during September, it has been announced by Thomas B. McCabe, Foreign Liquidation Commissioner.

Sales of the planes and spare parts realized a sum of $71,357 during the month, bringing the cumulative total for sales abroad to $538,440, in two months of operation under FLC.

In addition, FLC Aircraft Division sold five planes from RFC stocks for export, total sale price being $151,980. This sum brought total sales made for RFC to $4,752,679, including all sales

Philco "Thirty" Industrial Truck Storage Battery gives 30% longer life and is identified by its distinctive red connectors.

FOR 50 YEARS A LEADER IN INDUSTRIAL STORAGE BATTERY DEVELOPMENT

Tune in The Radio Hall of Fame, with Paul Whiteman and His Orchestra, Sundays, 6 P. M., EST; The Breakfast Club with Don McNeill, 9:45 A. M., EST, Monday through Friday—ABC (Blue) Network (Coast to Coast).

MODERN ELECTRIC INDUSTRIAL TRUCKS POWERED BY COST-SAVING PHILCO "THIRTY" STORAGE BATTERIES

Now you can get the kind of industrial trucks war experience proved the safest, most flexible and maintenance-free — ELECTRIC TRUCKS! And you can power your trucks with the greatest materials handling development since the fork-lift truck, itself—PHILCO "THIRTY", the Storage Battery with 30% longer life! Plan now for the big demands peace-time production will place on your materials handling equipment. Philco "Thirty" will give your trucks top capacity, *plus* savings in maintenance, depreciation and replacements. Write today for new catalogs giving specifications.

PHILCO CORPORATION · STORAGE BATTERY DIVISION · TRENTON 7, NEW JERSEY

PHILCO *Famous for Quality the World Over*

made by the Aircraft Division when it was under FEA prior to its transfer to FLC.

The FLC sales were as follows:

Two UC-64 (Noorduym Norseman) aircraft to the government of Iceland for $22,240. They originally cost $71,-102.

Three trainer planes, located in Calcutta, to the China National Aviation Corp. for use in the training of pilots. They cost $46,535 originally, and were sold for $8475.

One plane, a C-53 transport, leased to the Danish airlines at an annual rental of $8000. Outstanding leases now total $24,000.

Air Maintenance Center Planned by Lockheed Corp.

Plans for construction of hangars and facilities to make Lockheed Aircraft Corp.'s new Customers' Service Division the airline maintenance center of the West Coast have been announced. This service division, employing approximately 3000 people, will be headed by Reagan C. Stunkel, general service manager of Lockheed, under supervision of Carl B. Squier, vice president in charge of sales and service.

German Aircraft Control Equipment Patents Listed

Alien Property Custodian James E. Markham last week invited manufacturers of instruments and control equipment for aircraft to examine a group of 43 United States patents and patent applications which the alien property custodian vested from Askania-Werke, A. G., German manufacturer, soon after the outbreak of the war.

All these patents and patent applications are available for licensing to American citizens on a royalty-free non-exclusive basis for the remaining life of the patents, Mr. Markham said. An administrative fee of $15 is charged for each patent licensed.

The inventions in this group, Mr. Markham pointed out, include a variety of instruments and gyroscopic mechanisms for control of and navigational aids for airplanes. One device is for automatically controlling the fore and aft inclination of aircraft and, the custodian said, a number of the patents deal with steering mechanisms and apparatus. Various stabilizing, course indicating and remote control devices are also included. Gyro-magnetic compasses and compass follow-ups are the subject of other patents.

A list of these patents and applications may be obtained from the Patent Use & Development Section, Office of Alien Property Custodian, Washington 25, D. C.

Rohr Stops Reconversion, Continues Subcontracts

Plans of Rohr Aircraft Corp., Chula Vista, Calif., to convert to manufacture of such consumer goods as refrigerators and washing machines have been deferred in favor of aircraft subcontracts awarded recently.

Orders have been received from the Douglas and Lockheed factories to supply power plant installations for the C-54 which is being converted from military to civilian use and the Constellation, transport plane.

"There is enough work at our plant to keep the present force of 1000 busy for many months," said Fred Rohr, president. "We did not expect to receive so many commercial aircraft contracts, and we have had to assign all our available tooling and engineering facilities to this work."

New Aircraft Lacquer Improves Plane Safety

A new aircraft lacquer that assures improved safety in airplane operation by reducing fire hazards in lacquered surfaces has been announced by Monsanto Chemical Co., St. Louis.

Skylac, the new Monsanto finish, was developed for use on fabric-covered, exterior control and plane surfaces and on interior decorative areas. It combines increased weather resistance, high tautening effect and ease of application with high fire resistance.

When exposed to flame, Skylac-surfaced fabric will not support combustion, while under the same conditions conventional materials flare up in a quick flame. Because of its high solids, fewer coats are required than with the usual cold spray finishes. Since Skylac is designed to spray at room temperature, no special equipment is necessary.

As much as 1000 square feet of fabric-covered area on large transport planes will be finished with the new material. These include aileron, rudders and elevators, where metal is not suitable.

All American Aircraft Introduces New All Metal Personal Monoplane

A NEWCOMER in the light plane field is the Ensign, recently placed in production by All American Aircraft Inc., Long Beach, Calif.

This all metal, low-wing monoplane is powered with an 85-horsepower Continental engine which gives it top speed in excess of 125 miles per hour and a practical cruising speed of 112 miles per hour. With a useful load of 550 pounds and a cruising range of 500 miles plus, the Ensign affords the private flyer air-travel speed and comfort at motor car operating costs. The plane climbs skyward at 700 feet per minute and performs well at ceilings to 13,500 feet. The wing span is 33 feet and fuselage overall length, 22 feet. Wings and tail surfaces of the new plane are of cantilever construction.

Features of the Ensign include tricycle landing gear, differential hydraulic brakes, a full-view moulded plexiglass bubble enclosure, free of obstructions and a styled interior on a par with that of a high priced motor car.

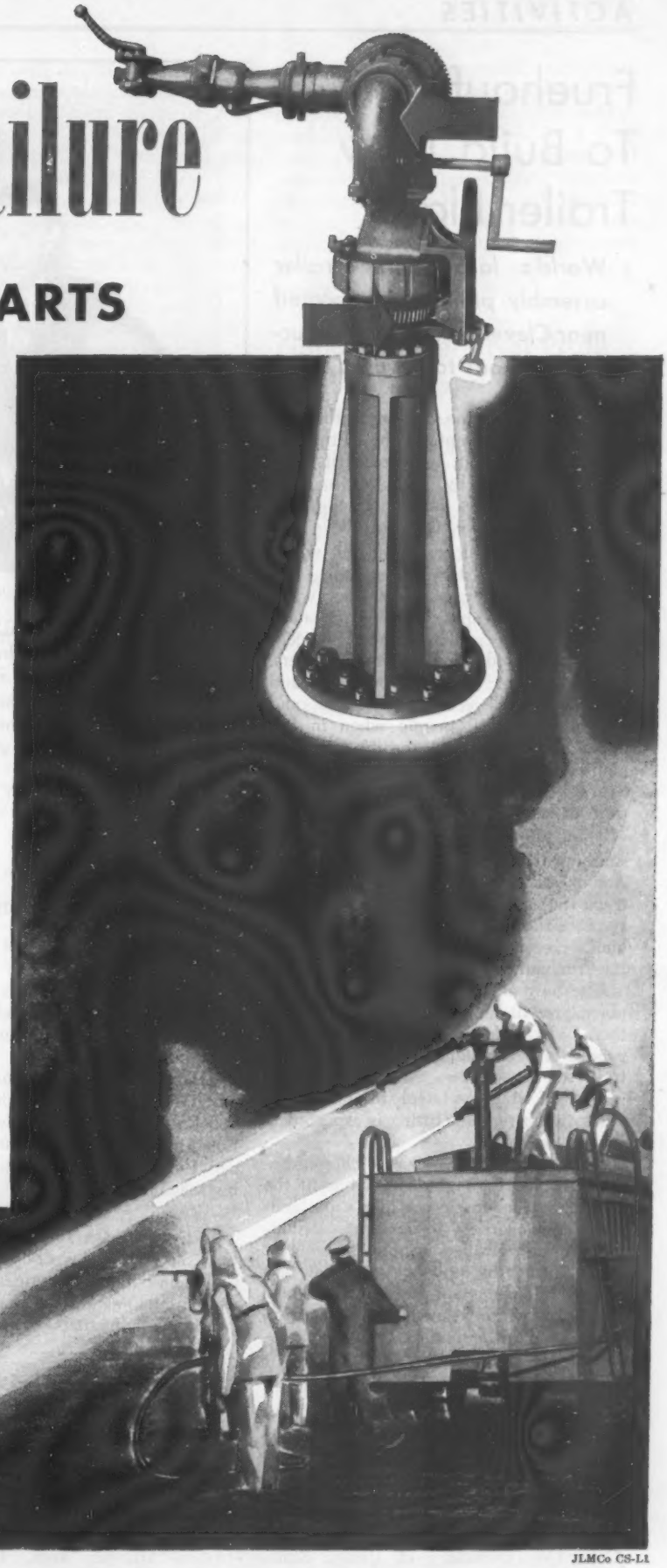
The All American candidate for post-war business and sports flying honors sells for $3000, flyaway Long Beach.

Production of 5000 in the next year is anticipated by company officials.

Prevent Failure

OF CRITICAL PARTS

with Surface-Hardened STAINLESS



No chances can be taken that critical parts will fail in life-saving equipment like this aircraft crash truck. When in operation the nozzle must move freely and easily so that the operator can "sweep" the flaming gasoline away from the trapped flyers with the high-pressure water stream.

Even under the terrific force developed by the high-velocity jet, the bearings in the swivel joints of the nozzle must not bind or seize. And of course there must be no rust or corrosion to impede the smooth action of these bearings.

That is why Samuel Eastman Company installs bearings of Surface-Hardened Stainless Steel in the swivel joints of the nozzle.

With the new Surface-Hardening Process (Malcomizing), it is now possible to take advantage of the inherent strength and corrosion-resistance of stainless steel, and at the same time to get wear-resistant surfaces as hard as 95 Rockwell 15N (73 Rc).

Wherever remarkable ability to stand up under abrasive wear, combined with resistance to heat, corrosion, and oxidation will prevent failure of critical parts, you should consider the Stainless Surface-Hardening Process.

For More Information

If you want to know more about the advantages of this new process and how you can use it, write for the technical bulletin. If you wish, one of our metallurgical engineers will discuss it with you.

JLMCo CS-L1

SS HC

STAINLESS SURFACE HARDENING CO.

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SUBSIDIARY OF INDUSTRIAL STEELS, INC.

America's Largest Warehouse for Stainless Sheets, Bars, Tubings, Wire, Valves, Fittings, Electrodes and Hardware

Fruehauf Firm To Build New Trailer Plant

World's largest truck-trailer assembly plant to be located near Cleveland. Mass production methods to be used

GROWTH of the trailer method of hauling has prompted the Fruehauf Trailer Co., Detroit, to increase its production facilities by planning to construct the world's largest truck-trailer plant at Avon Lake, O., near Cleveland.

The new one-floor plant, on which construction will start immediately, will be 2250 feet long and 400 feet wide, and will permit application of the automobile industry's mass assembly techniques to production of truck-trailers. The new plant, including buildings and equipment, will cost $4½ million, and will employ 2500 people when in full operation. Although the Avon Lake plant will be the company's largest, the firm's headquarters will remain at Detroit, at least for the present.

The company developed from a blacksmithing business of the Fruehauf family. Active today in management of the truck-trailer company are three brothers: H. C. Fruehauf, president; R. A. Fruehauf, executive vice president; and H. R. Fruehauf, first vice president.

The new assembly plant will not displace present facilities but will augment them. It will be devoted to quantity production of standard model truck-trailers.

Use of stainless steel in Fruehauf's truck-trailer manufacturing is expected to be resumed soon.

The Avon Lake site was chosen because of the high grade of labor in the community, favorable transportation facilities, and nearness to materials. Shipment of new trailers can be made over important nearby highways, and materials and components can be transported to the plant by truck and railroad. Seventy per cent of the materials used by Fruehauf come from within 100 miles of the new plant.

Trackless Coal Mine Opened By United States Steel

Opening its first coal mine since the end of the war. United States Coal & Coke Co., subsidiary of United States Steel Corp., has begun taking bituminous coal from a mine which is expected to yield 1200 tons daily. The new mine, near Gary, W. Va., is completely mechanized, coal being transported from the seam to the portal by conveyor belt.

NEW IDEA OFFICIALS: Aviation Corp. has purchased the controlling interest in New Idea Inc., manufacturers of farm machinery (STEEL, Nov. 5, p. 123). Left to right, sitting: Irving Babcock, president of Avco; Henry Synck, former president of New Idea and now a director; William F. Wise, new president of New Idea. Standing: T. H. Oppenheim, J. H. Oppenheim and J. A. Oppenheim, all vice presidents of New Idea

BRIEFS . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

Farnsworth Television & Radio Corp., Ft. Wayne, Ind., has purchased a plant of the Hosdreg Co., Huntington, Ind.

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Ellinwood Industries, Los Angeles, has purchased National Machine Products and California Motor Cultivator Co. Ltd., Los Angeles, and will manufacture garden tractors, farm implements and adding machines.

—o—

SKF Industries Inc., Philadelphia, has published a 270-page book entitled "Ball and Roller Bearing Engineering" to serve as a fundamental text on all phases of bearing applications to industry.

—o—

Caine Steel Co., Los Angeles, will begin construction of its new office building soon, Marshall Wais, president, has announced.

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Carboloy Co. Inc., Detroit, has appointed Sligo Iron Store Co., St. Louis, distributor for the southern Illinois and eastern Missouri area. Distributor for southwestern Michigan and northcentral Indiana is South Bend Supply Co., South Bend, Ind.

—o—

American Chain & Cable Co., Bridgeport, Conn., has purchased the Certified Gauge & Instrument Corp., Long Island City, N. Y., and will continue manufacture of the helicoid movement pressure gauge under the name American Chain & Cable's Helicoid Gauge Division.

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Steel Materials Corp., Detroit, has acquired control of Phillips Pump & Tank Co., Cincinnati, and will enlarge the Phillips plant where large-scale production of household utensils and a new type pump is planned.

—o—

General Electric Co., Schenectady, N. Y., has completed the first of 15 railroad-mounted unit substations for the U. S. S. R., at its Pittsfield, Mass., plant. Completely mobile, these units will serve the electrical needs of wartorn areas until permament substations can be built.

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Toolcraft Products Co., Dayton, O., has begun construction of a $35,000 plant addition.

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Reconstruction Finance Corp. has opened a branch sales office at 50 S. Third St., Columbus, O.

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Layman Welding Supply Co., Grand Rapids, Mich., welding supply house, has been opened by R. Dudley Layman,

former district manager for Lincoln Electric Co., Cleveland.

—o—

Charles T. Brandt Inc., Baltimore, is continuing work in precision sheet and plate products, but also plans to produce a steel dowel for use in construction of concrete roads and airport runways, a line of road construction devices and is beginning the manufacture of standard truck bodies.

—o—

Flagship Engine Co., Dundalk, Md., plans production soon of gasoline engines for use in cruisers of the Owens Yacht Co., parent company.

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Boston Iron & Metal Co., Baltimore, has changed its name to Boston Metals Co.

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Liquid Carbonic Corp., Chicago, is erecting a factory in Morrison, Ill.

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Locomotive Development Committee, Bituminous Coal Research Inc., Baltimore, is conducting a research project at Johns Hopkins University concerned with a method of driving gas turbines with pulverized coal.

—o—

Gar Wood Industries Inc., Detroit, has purchased Buckeye Traction Ditcher Co., Findlay, O., and will expand its operations.

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Morecorder Mfg. Co., Baltimore, has been organized to manufacture an electronic dictating machine, to be on the market soon.

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Crosley Motors Inc., Cincinnati, has purchased a plant in Marion, Ind., for production of the Crosley automobile.

—o—

Locke Insulator Corp., Baltimore, subsidiary of General Electric Co., is completing an extended program of plant improvement.

—o—

Kinner Motors Inc., Los Angeles, has changed its name to Gladden Products Corp. The same manufacturing and sales programs will be carried on under the new name.

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Penetone Co., Tenafly, N. J., chemist, has begun an expansion which will include addition of another floor to its present building and construction of a building on recently-acquired adjoining property.

—o—

Briggs Clarifier Co., Bethesda, Md., has completed construction of new office and laboratories.

Cincinnati Lathe & Tool Run By New Management

Cincinnati Lathe & Tool Co., Cincinnati, has been incorporated with authorized capital of $100,000, and has acquired the land, buildings, machinery, designs, inventory, unfilled orders, and trade name of Cincinnati Lathe & Tool Co., Oakley, O., which discontinued manufacturing operations because of the retirement of its president.

The new company is a subsidiary of Cincinnati Milling Machine Co., Cincinnati, but will be operated independently of the parent company. Manufacture of "Cintilathes" will be continued under the new management which includes: Millard Romaine, president; and E. W. Mueller, secretary-treasurer.

Youngstown Sheet & Tube Reports Drop in Net Profit

A decline in net profit in the third quarter of this year has been reported by Youngstown Sheet & Tube Co., Youngstown. Net profit that quarter was $1,697,943, compared with $2,190,260 in the second quarter of 1945 and $1,818,-768 for the third quarter of 1944.

Net profit for the first nine months of 1945 was $5,253,154 against $5,847,615 for the same period last year.

The decline in third quarter net profit is a result principally of a drop in net sales and revenue and an increase in provision for depletion of minerals, depreciation of plants and equipment and amortization of emergency facilities.

College Training Program Devised for Hagan Workers

To offset the lack of young chemists and engineers caused by the war, Hagan Corp., Pittsburgh, and its subsidiaries have announced a plan to back employees in getting college educations in night school. The plan, based on the idea of upgrading the employees when their courses are successfully completed, will be available to any member of the companies who may take either undergraduate or graduate work in a field relating to the technical or commercial activities of the companies. Complete payment for the education will be made in two instalments, the first upon the student's registration, and the second upon his graduation if he remains in the employ of the Hagan Corp.

National Steel's Net Profit Declines in Third Quarter

Net profit of National Steel Corp., Pittsburgh, for the third quarter of 1945 declined 41 per cent from second quarter. Third quarter net profit was $2,027,502 compared with $3,453,183 in second quarter. Net profit for the third quarter of 1944 was $2,667,515.

The corporation's net profit for the first nine months of 1945 was $8,910,-673 against $8,080,974 for the corresponding period of 1944.

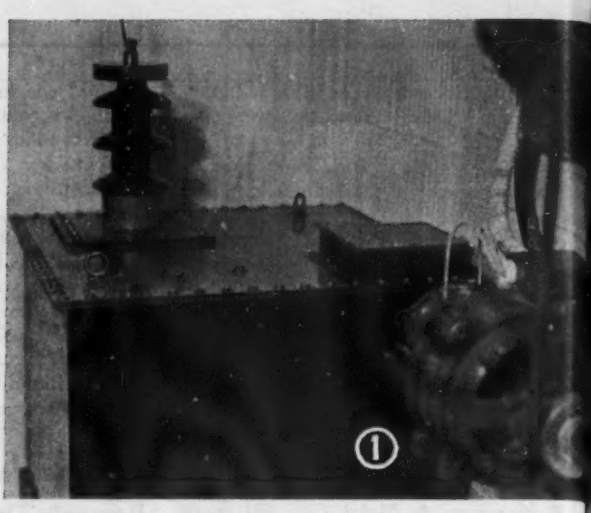
Bethlehem Forms Operating Subsidiary on West Coast

Bethlehem Steel Co., Bethlehem, Pa., has set up a new wholly-owned subsidiary, the Bethlehem Pacific Coast Steel Corp., to operate its Pacific Coast properties.

W. H. Fuller, formerly vice president of Bethlehem's Pacific Coast Steel Division, will be president of the new corporation which will operate steel plants, mill depots, and fabricating shops at Seattle; South San Francisco, Los Angeles, and Alameda, Calif.; and Portland, Oreg. General offices of the company will be in San Francisco.

MODELS AID SALES: Miniature scale models of Mercury industrial trucks, tractors and trailers are shown loading and unloading a freight car, to demonstrate their efficiency to prospective buyers

electrostatic spraying of Porcelain Enamels



By JAMES B. WILLIS
Pemco Corp.
Baltimore

Appreciable savings result in material consumed and uniformly coated product is produced with minimum loss from overspray. Process valuable in spraying flat surfaces with simple flanges, or symmetrical shapes—especially where operation is highly repetitive. No special preparation of enamel required but accurate control of its physical properties is essential. Number and location of guns for most efficient operation involves some experimentation on each installation, Mr. Willis points out in this report, also presented to American Ceramic Society

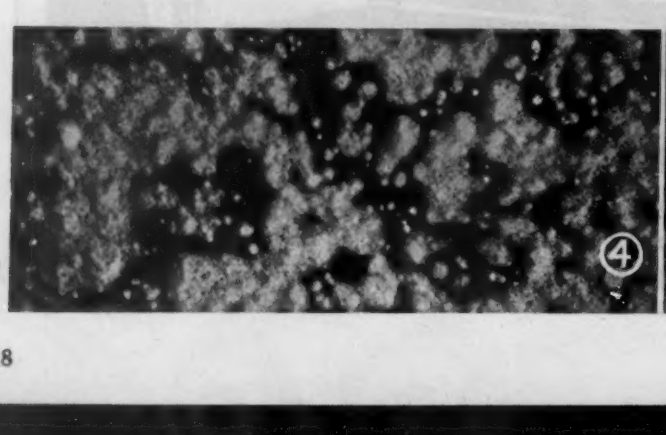
ONE OF the more serious problems which has confronted the enameler for many years has been the problem of overspray. Experience has shown that even in the best run plants as much as 50 per cent and sometimes even greater amounts of enamel put through a spray gun never reach the surface of the ware. While it is true that a large portion of this material remains in the spray booth and can be reclaimed, it represents a considerable economic loss since not only material but the time and labor required to prepare the milled enamel are involved.

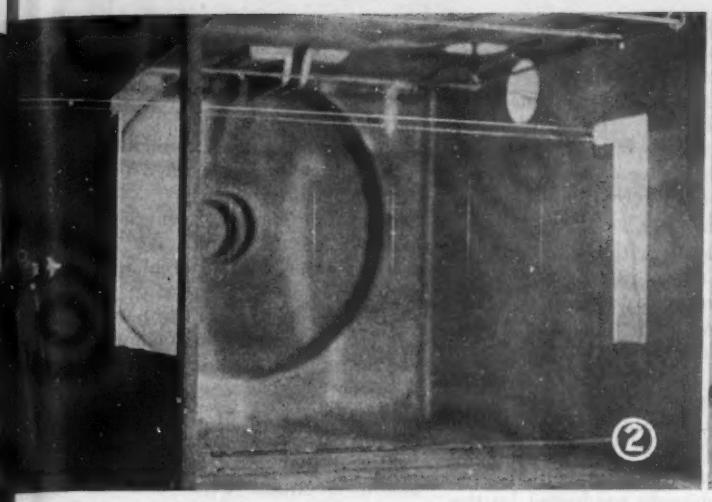
Furthermore, it is usually undesirable to use the reclaim for finish-coat application. The matter of salvage is often difficult since it is hard to prevent contamination, especially when the material remains in an open spray booth. Much time and money have been spent in the development of spraying equipment and training personnel in the spraying technique. Special types of booths to minimize the contamination and facilitate the reclaiming of the overspray have been constructed. The best water-washed spray booth on the market, however, will not prevent contamination of reclaimed material with banana peels, apple cores, an occasional plug of tobacco, and other miscellaneous items which have a strange habit of finding their way into the reclaim enamel.

A number of years ago, the Harper J. Ransburg Co. of Indianapolis was faced with a similar problem relating to the application of paints and lacquers. Organics cannot be salvaged as are enamels, and any material which does not find its way to the surface of the ware may be counted as lost as well as difficult to remove from the spray booths and equipment. Because of these problems, the Ransburg Co. conceived the idea of applying the principles of electronics to the problem and achieved a major success.

Considerable publicity has been given the electrostatic spraying process, especially during the war years when it has made possible the production of superior articles from the standpoint of uniformity of coating together with the elimination of the loss of coating materials, many of which were critical.

There has been little consideration given to electrostatic spraying of por-





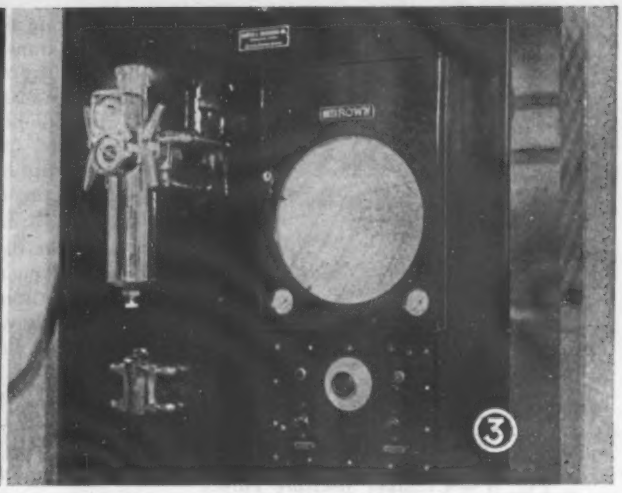


Fig. 1—High voltage direct current for charging the spray is obtained from this power pack

Fig. 2—Spray booth showing wires and rods in the electrode system

Fig. 3—Pressure control panel

celain enamel. Experiments were carried on in an enamel plant, but no decision was made as to whether the process was applicable to the porcelain enamel industry. Equipment was recently procured, and an investigation was begun to determine whether or not the electrostatic spraying process could be applied to porcelain enameling.

The process consists of the charging of the spray particles in an electric field and the attraction of these particles to the object to be coated, a process not dissimilar, theoretically, from electroplating except that in the latter case the metallic particles are suspended in a water medium, whereas with the former, the spray particles are suspended in air.

The object to be sprayed is grounded and is surrounded by an electrical field of such a nature as to impart a negative charge to the atomized particles entering the field. The particles so charged migrate toward the object which bears a positive charge. Such a field is provided by a specially designed rectifier and transformer which produces a very high voltage (Fig. 1). Power is supplied to the power pack in the form of a 220-v, single-phase, 60-cycle current. The secondary voltage reaches a maximum of 100,000 v, single-phase, half-wave, 60 cycles, with a current rating not exceeding 10 milliamperes.

The electrical field is produced by an electrode system composed of a series of fine copper wires, suspended parallel to the surface to be sprayed (Fig. 2); if the pieces are being sprayed in a horizontal position, the electrode system will be suspended horizontally. It is essential that the electrode system conform in contour to the object being sprayed. Exception may be taken to this rule with cylindrical or similarly shaped objects which can be rotated while passing through the field.

The electrode wires are spaced in relation to one another and to the grounded object so as to produce the proper intensity and direction of impulse in the field established. Generally speaking, a spacing of 6 to 8 in. between electrode wires and 10 to 12 in. between the electrode and the piece has been most efficient. Since the force of the field is proportional to the distance between electrode and ground, an increase in the distance rapidly decreases the force of the field, but the distance must be adequate to obviate the possibility of a static spark between electrode and ground, nullifying the effect of the field entirely.

The force of the field is also proportional to the difference in surface area of the electrode wires as compared with the area of the object being sprayed. The aggregate area of these wires must be very small in comparison with the area of the article opposite the electrode. If this principle is carried to the extreme, however, a noticeable decline in efficiency is noted. A No. 30 copper wire has been found most effective for this purpose and is recommended for all installations.

For efficiency of operation, the ware is usually suspended on a conveyor line which is grounded to provide a negative pole for the system. The conveyor used in the present investigation was equipped with a variable-speed motor and a variable-speed transmission providing any desired cable speed from 2½ to 35 fpm.

The spray gun used was a standard make of air-operated automatic gun. A variety of tips, needles, and atomizing caps was tried to determine the most satisfactory combination of gun fittings for the process.

The enamel used in the spraying operation was contained in an ordinary 2-gal pressure tank. A gallon bucket containing the enamel was placed in the tank to avoid the necessity of washing the entire pressure tank after each operation.

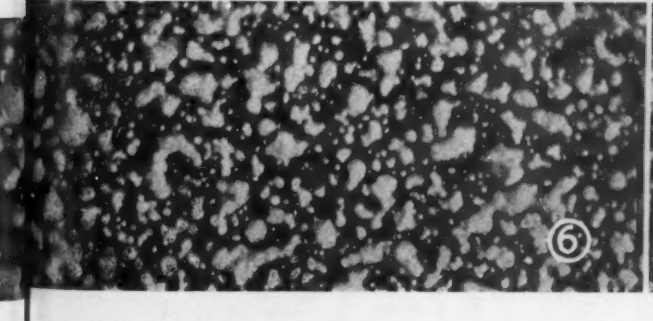
Air was supplied for the fluid pressure, the atomizing pressure, and for the

Fig. 4—Atomization classification No. 1; poor degree and uniformity of atomization. 20X

Fig. 5—Atomization classification No. 2; slight degree of atomization. 20X

Fig. 6—Atomization classification No. 3; normal atomization. 20X

Fig. 7—Atomization classification No. 4; over atomization. 20X



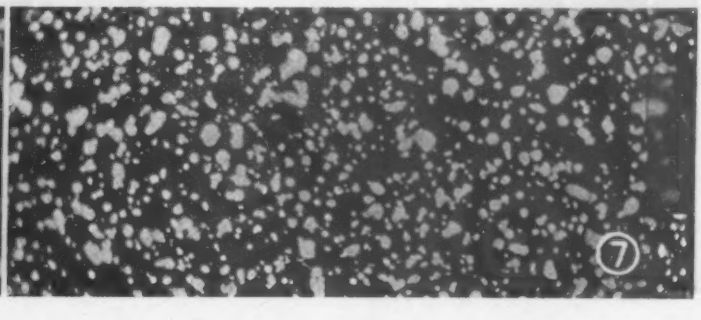


Fig. 8 — Constant pressure curves

operating pressure for the automatic gun from the plant-pressure system at approximately 100 psi. The main line pressure was piped through an air transformer at line pressure to the quick shut-off valve for operating the automatic spray gun. The line pressure was reduced through the transformer to the atomizing line and the fluid tank. A second transformer provided a controlled air supply for the throttler controller mechanism, which in turn actuated the diaphragm valve controlling the pressure on the fluid tank. The throttler controller gave accurate control of fluid pressures to within plus or minus 0.2 lb (Fig. 3).

To obtain data on the viscosities of the various enamel slips, a modification of the Harrison consistometer was designed which would permit a relatively simple but at the same accurate measure of the relative viscosity of the slips in the terms of the number of seconds required for 100 cc of slip to flow through a capillary at the base of the flow tube.

The preliminary investigation and investigations previously conducted by the manufacturers of the equipment revealed the following facts:

(1) In spraying, the charge on the grounded object is always positive and the charge on the electrode is always negative; the charge in the field, therefore, is always negative and the charge placed on particles entering the field will be negative.

(2) There is no means of actually measuring the force of the field; the length of the spark gap is an approximate measure of this force.

(3) Increases in voltage within the limits of any single installation do not appreciably affect the force of the electrostatic field.

(4) The dielectric strength of a given material has no effect on the ability of that material to react to the force of the field.

(5) Additions of electrolytes have no effect on reactability of enamel slip.

(6) In spraying irregular sheets, it is essential that the electrode system conform in contour to the contour of the object being coated.

(7) A spacing of from 6 to 8 in. between electrode wires and 10 to 12 in. between the electrode and the object has been found most efficient.

(8) The axis of the spray must make an acute angle of 15° with the surface to be coated for most efficient results.

(9) The uniformity of the coating is dependent largely on the location of the spray gun.

(10) The smallest fluid tip available and an atomizing cap with a maximum number of air holes provides a maximum degree and uniformity of atomization.

(11) The effect of particle size on ability to react to the field lies in the force of inertia in particles of increased size and density. The greater the inertia of the particle passing through the field, the less effective the force of the field; no maximum effective particle size has been determined.

(12) A maximum degree and uniformity of atomization is essential.

(13) A coating of enamel already applied to an object being coated apparently has no effect on the ability of that object to pick up additional coatings.

(14) The most satisfactory specific gravity lies in the neighborhood of 1.70 gm per cc.

(15) Ground-coat and cover-coat enamels may be sprayed with an equal degree of satisfaction.

(16) Fluid and atomizing pressures must be controlled more accurately than can be done by ordinary means.

(17) The capacity of any single unit

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TABLE I

EFFECT OF VARIATIONS IN SET

Sample No.	Flow time (sec.)	Atomization	Enamel wt. (gm)	Appearance of sprayed plate
82	22.7	3	45.6	Good
83	21.3	3	41.1	Good
84	18.5	3	40.1	Slightly dry
85	15.6	3	38.1	Slightly dry
86	12.2	3	38.1	Sagged
87	10.9	3	38.1	Sagged

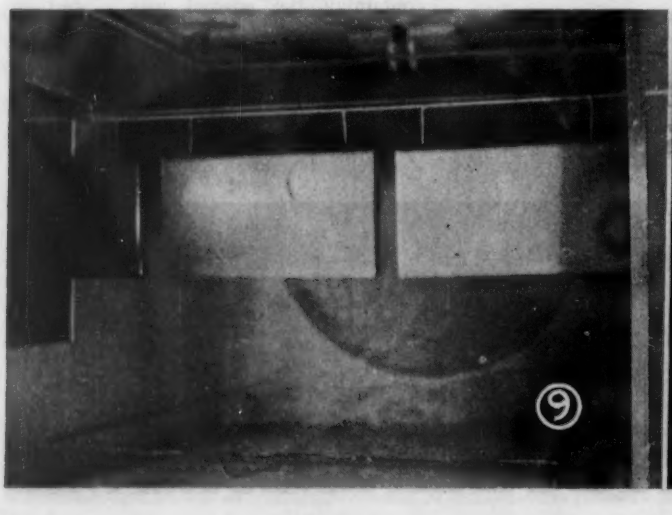
TABLE II

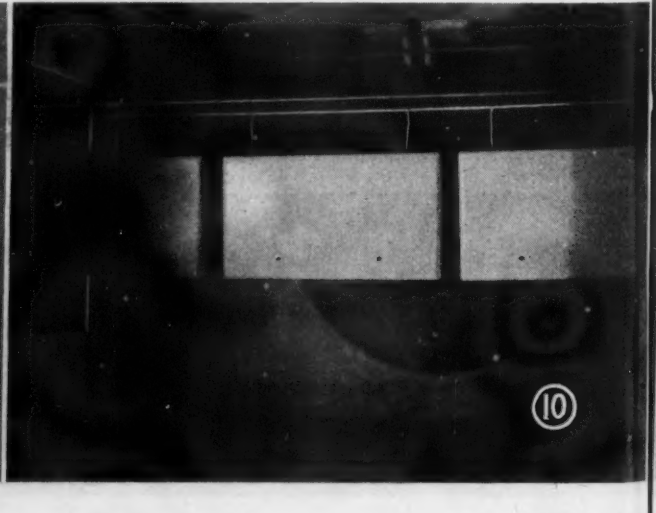
EFFECT OF VARIATIONS IN FINENESS

Sample No.	Fineness (% on 200-mesh)	Atomization	Enamel wt. (gm)	Application (%)	Sprayed plate appearance
77	15	3	539.3	33.7	Granular
78	10	3	549.7	32.1	Granular
79	5	3	536.0	28.8	Slightly granular
80	2	3	532.8	28.3	Slightly granular
	On 325-mesh				
81	2	2-3	538.3	34.1	Good

Fig. 9—Spraying process without electrostatic field

Fig. 10—Spraying done with the electrostatic field in operation





PNEUMATIC Scrap Collection

PNEUMATIC collection and disposal of light industrial scrap as well as chips in the form of turnings and borings has stimulated employment of flexible air-flow conveying systems, suction and blower operated, in both steel and non-ferrous metal fabricating plants. Higher production, stress on segregation, improved economy in oil reclamation and reduction in handling hazards are contributing factors.

Milling machines, lathes, automatic screw machines, drill presses and slab millers in the brass industry tend to accumulate chips in large quantities. When removed manually at uncertain periods, these accumulations handicap workmanship and appearance.

Pneumatic removal at the source eliminates bulky accumulation. Too, disposal is largely automatic, like many of the machines to which the system is applicable. Also minor cuts and accidents are reduced, for often chips are razor-sharp.

In suction systems, the air drawn past the cutters cools them conserving cutting oil to considerable degree as well as contributing to the reclamation. When fumes are generated, these are also drawn from working areas. While in engineering principle, pneumatic conveying systems by suction are more or less standard, flexibility is broad enough to operate on steel, brass or aluminum, covering the gamut of metal cutting equipment.

B. F. Sturtevant Co., Hyde Park district, Boston, has installed numerous chip and turning conveying systems, designed for pneumatic distribution and disposal with capacity of better than 8000 lb per hour.

Typical installations with pneumatically created suction for chip removal are employed in the brass fabricating industry slab millers. To remove outer scale and impurities from slabs of brass and copper after being cast to required thickness and width, slab millers (a single head planer) are used. The knife, a series of milling cutters set side by side to a width of 30 in. in some setups, removes thousands of chips an hour.

Scale from 0.007 to 0.015-in. is released, chips curling tightly to about 1/8-in. in diameter, 1-1½ in. long. Abrasive and sharp, they must not pass through conveyor fans.

Servicing two slab millers simultaneously, a hopper at the bottom of each miller collects the chips by gravity. From these hoppers the chips are conveyed through ducts into a Cyclone separator where they are separated from the air stream, falling into airtight storage bins. The air is drawn through the exit tube of the Cyclone into a fan and discharged to atmosphere.

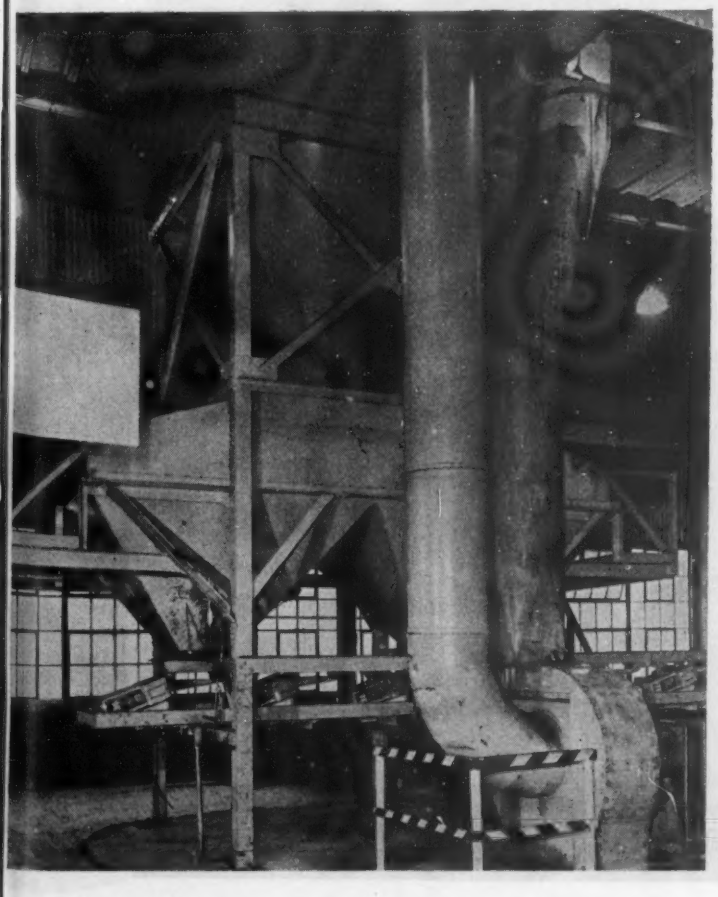
The storage bins are made with two compartments, an air operated blast gate distributes the load into either compartment at the will of the operator. The bottom of each storage bin is also equipped with air operated blast for dumping. Above gates are interlocked, so can be operated only in proper sequence.

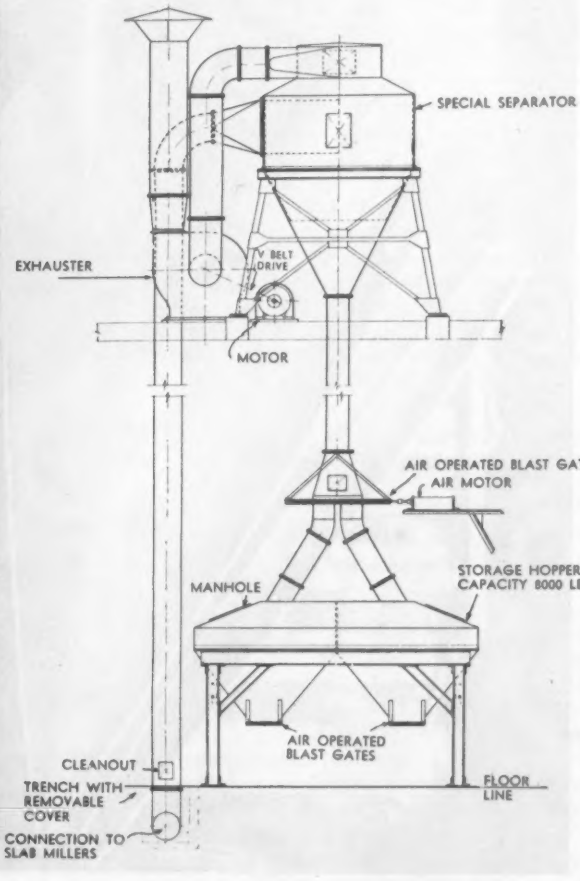
The volume of air per pound of

(*Please turn to Page* 178)

Left—Installation of pneumatic conveying equipment at Indianapolis plant of Bridgeport Brass Co. B. F. Sturtevant photo

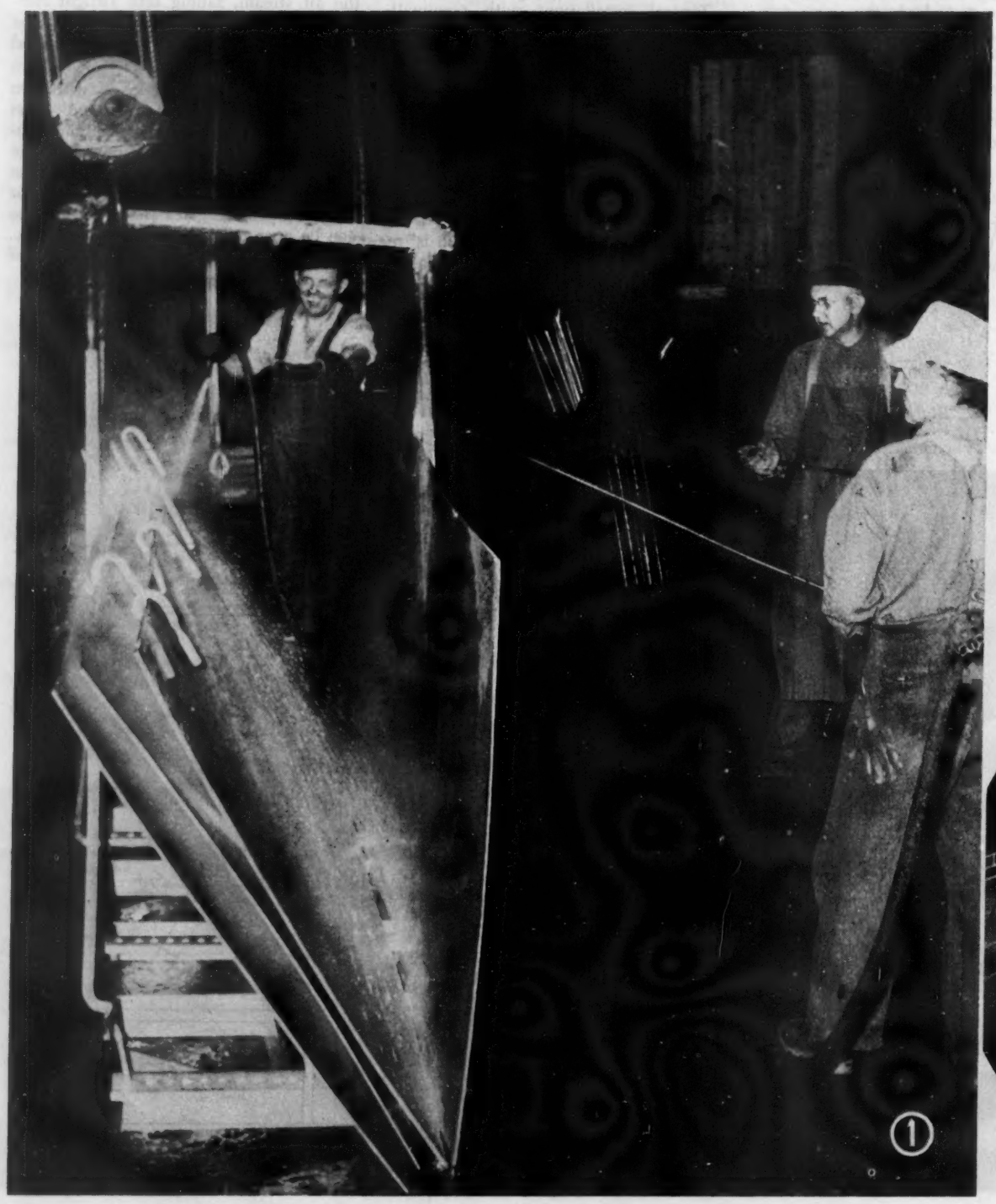
Right—Diagram of elevation showing arrangement of pneumatic conveying equipment for exhausting brass chips from a slab miller





SODIUM HYDRIDE

Bath containing active sodium hydride penetrates through stainless steel and uniformly descales all surfaces with no loss of metal and no deleterious effect on structure. Disposal of waste residue eliminated



DESCALING

By L. W. TOWNSEND
Manager
Composite Steel Division
Jessop Steel Co.
Washington, Pa.

SODIUM hydride descaling process is a relatively new method of removing scale formed on steel by oxidation at elevated temperatures. Particularly suited for descaling stainless steels, the method eliminated objectionable features of acid pickling. It is based on use of a powerful reducing agent—sodium hydride dissolved in fused caustic — which reduces the metallic oxides in the scale.

With this process, reduced scale remains in loosely adherent form on the surface of the work. Sodium hydride is formed in the fused caustic bath by combining sodium metal with hydrogen in generators installed in the caustic tank. In operation, scale is reduced by immersing work in the fused bath. Upon quenching work in water, reduced material is blasted from the surface by a few seconds' dip in acid.

Jessop Steel Co. has used its installation to pickle stainless steels of all types —pure copper, pure nickel, high-speed composite tool steel, and high carbon high-chromium tool steel, as well as Stellite type alloys. In fact, the process is to be recommended for use by any mill producing electric furnace steel.

In the production of stainless clad steel at Jessop, one of the early problems faced was that of creating a white, pickled stainless surface and at the same time preventing the over-pickling of the low alloy backing steel. The need for a method of pickling which would not dissolve a film of metal from the surface in order to remove the oxide formed during heat treatment had long been recognized at the time this process was introduced. Obviously, loss through dissolution of as much as 3 per cent of the weight of stainless sheets, in order to produce the proper finish, was a very great waste of acid, stainless steel, and time. This applied to any pickling process antedating sodium hydride descaling.

The condition described was true of the 18-8 stainless steels. However, on the higher chromium-nickel stainless steels, and the higher straight chromium steels, this condition was even more wasteful, as some of these types could not be pickled at all until after they had been thoroughly sand blasted or grit-blasted. After considering the solid stainless steels and rustless irons, the waste involved in the acid pickling of composite sections where one side is low carbon steel becomes obvious. Sodium hydride pickling (descaling) has proven to be the solution to many of these difficulties.

In essence, the problem was to produce a pickling bath which would not dissolve metal, and make it so oxygen-hungry that any oxide on the metal would be reduced or partially reduced to such a condition that subsequent removal could be accomplished with a minimum dissolution of the metal itself. The bath developed which would not dissolve the metal is molten caustic.

The bath has to be maintained at 700° F so that the caustic will remain molten. As will be shown later, this temperature also serves another purpose. The method used to make this molten caustic bath (76 to 78 per cent caustic) oxygen-hungry is by addition of metallic sodium, along with hydrogen, so as to form a solution with 2 to 3 per cent sodium hydride in molten caustic. Sodium hydride dissolves in molten caustic and the resulting solutions reduce iron oxide to metallic iron. Sodium hydride reacts with the scale ($Fe_3O_4 + 4NaH \rightarrow 3Fe + 4NaOH$) to form caustic soda, which is the material comprising the bath itself.

Equipment. Required conditions for descaling are met by construction of a low-carbon steel tank (Fig. 3) 20 ft long, 6 ft deep and 6 ft wide, mounted in brick setting with the top about 3 ft above floor level. Around tank is constructed a furnace with a gas burner at each of the four corners and flues running around the tank and up a stack. Automatic heat controls are installed to maintain the bath at proper temperature with a minimum of manual adjustment. There is an excessive loss of hydride at higher temperatures, whereas at lower temperatures additional time is required to melt to the reaction point the frozen layer of bath which forms.

Along one side of the tank are the

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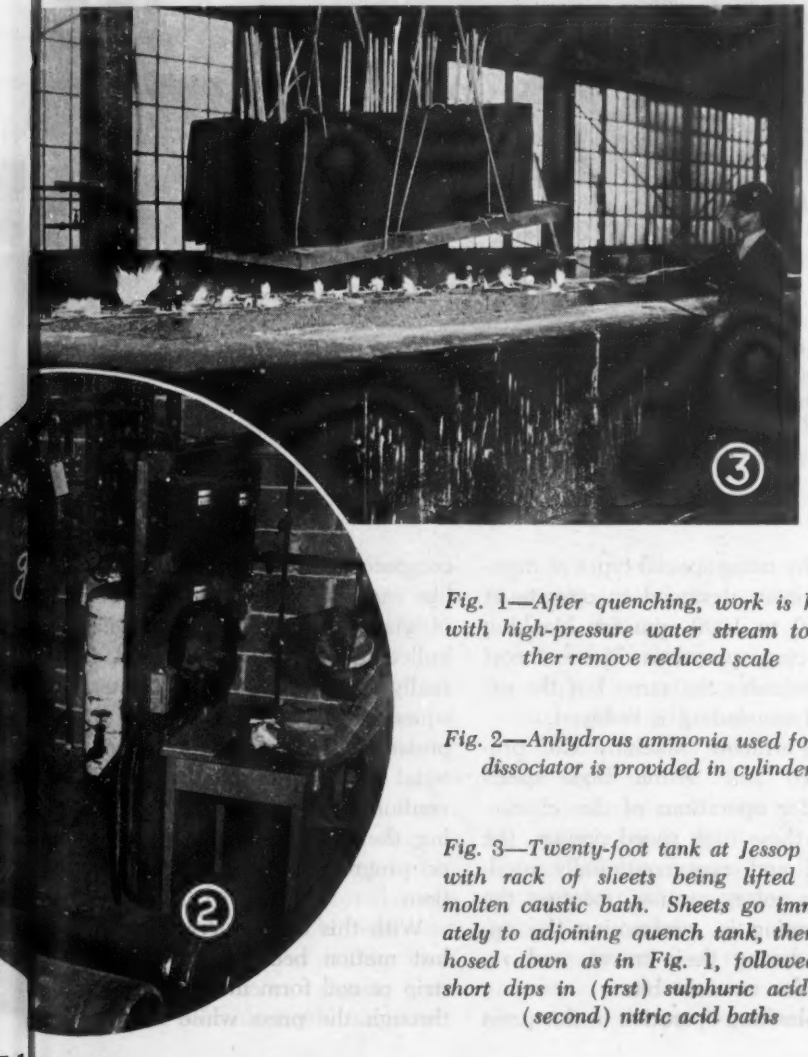

Fig. 1—After quenching, work is hosed with high-pressure water stream to further remove reduced scale

Fig. 2—Anhydrous ammonia used for this dissociator is provided in cylinders

Fig. 3—Twenty-foot tank at Jessop Steel with rack of sheets being lifted from molten caustic bath. Sheets go immediately to adjoining quench tank, then are hosed down as in Fig. 1, followed by short dips in (first) sulphuric acid and (second) nitric acid baths

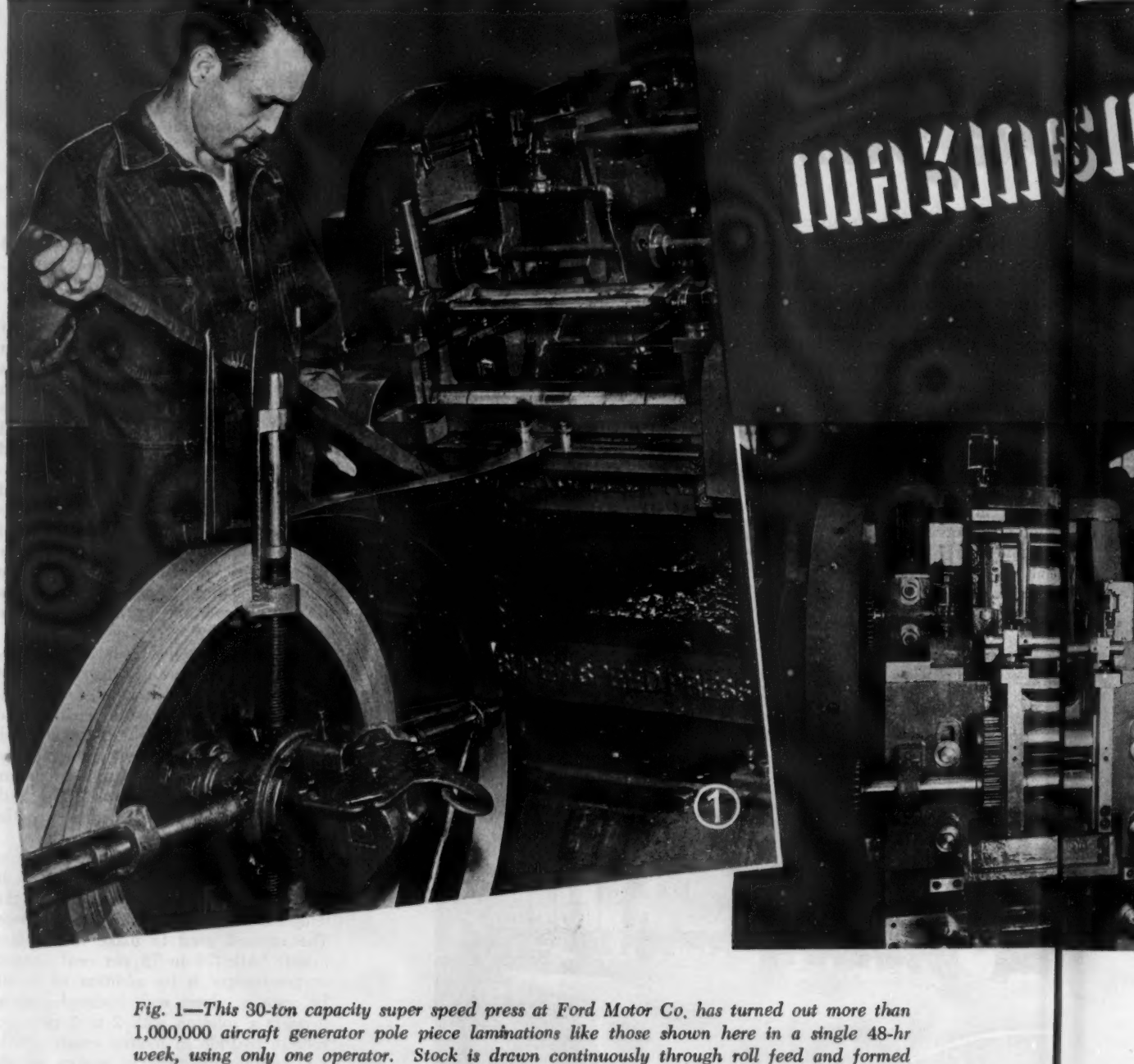

Fig. 1—This 30-ton capacity super speed press at Ford Motor Co. has turned out more than 1,000,000 aircraft generator pole piece laminations like those shown here in a single 48-hr week, using only one operator. Stock is drawn continuously through roll feed and formed parts are stacked automatically and returned to front side of press through chute. Operator is shown unloading chute by threading wire through laminations. Ford Motor Co. photo

COMBINING old as well as new materials with new processing and fabricating methods often produces end products that are lighter, stronger and have lower production costs. Stamped steel products are an example. Much progress has been made in breaking down products and processes into unit operations that permit increased output of major importance to reconversion and peacetime economy.

Certain manufacturers of stampings, such as the Ford Motor Co., have discovered that production per press and per man can be greatly increased by using special types of high-speed presses designed to operate at from 350 to 1000 rpm for blanking and piercing operations. The first cost of dies remains the same but the expense of regrinding is reduced.

The Ferracute Machine Co. produces 10 and 30-ton high speed presses for operations of this character. In these high speed presses, the die bed and ram continually oscillate in a rotary motion, meeting the work coming in, performing the operation during their travel, and returning for an new bite.

The blanking operation in this press compared to conventional practice is like *shooting* a bullet through a pane of glass as compared to *throwing* a bullet at the glass. The blank is actually knocked out clean instead of squeezed or forced through. Such presses will blank or pierce any material that can be handled in a conventional press of equal tonnage, using the same type of single station or progressive dies up to five stations.

With this type of press there is no lost motion because the material in strip or coil form moves continuously through the press while the work is

SMALL PARTS at High Speed

Ford Motor Co. turns out 1500 blanks per minute on high speed press. Where material and conditions permit, speeds up to 2000 pieces per minute are reported

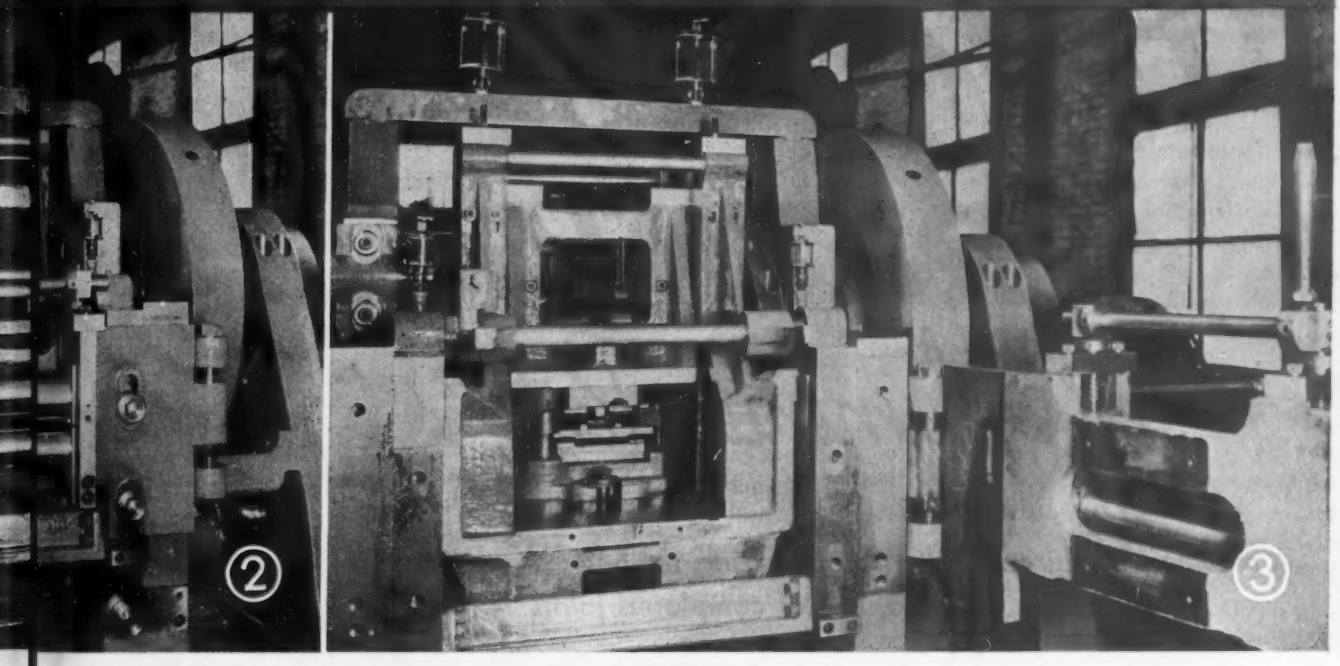

Fig. 2—Ferracute high speed press shown with roll feed mechanism in place

Fig. 3—Same unit as Fig. 2 but with roll feed swung away on its hinges to reveal dies which reciprocate in synchronization with movement of stock through the press

being done. This makes possible production speeds limited only by the physical characteristics of the product and the maximum speed of the machine.

The horizontal bed of this type of press is horizontally reciprocated by an eccentric driving crank. This movement is in the same plane and direction in which the work strip is fed. The punch holder is attached to the press ram and reciprocated vertically by the same crank movement that reciprocates the bed or die. Thus the press moves the tool rapidly from right to left coincident with the direction of the feed, at the same time that the cutting members are rapidly opening and closing.

Instead of halting the strip at blanking centers for cutting, the strip passes uninterruptedly through the die and is blanked and/or pierced at each down stroke of the crank. Speeds of 1000 strokes per minute are feasible for light, simple work. The speed can be quickly and easily adjusted to conform to the character of the work being produced.

The material feed can be adjusted to the correct speed for minimum scrap while the machine is running.

One company has produced 2000 blanks per minute on one press of this type, day in and day out, for several years.

Savings possible are illustrated by the use of these presses at the Ford Motor Co.'s plant at Ypsilanti, Mich., where they have been a contributing factor in the production of more than a million generators and starters for military vehicles and aircraft.

The two presses, a No. 1 (10-ton) and a No. 3 (30-ton), were used before the war to make insulators and small parts for Ford cars. With the

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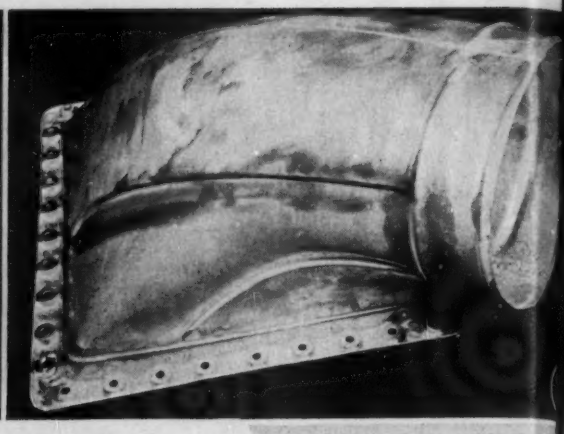
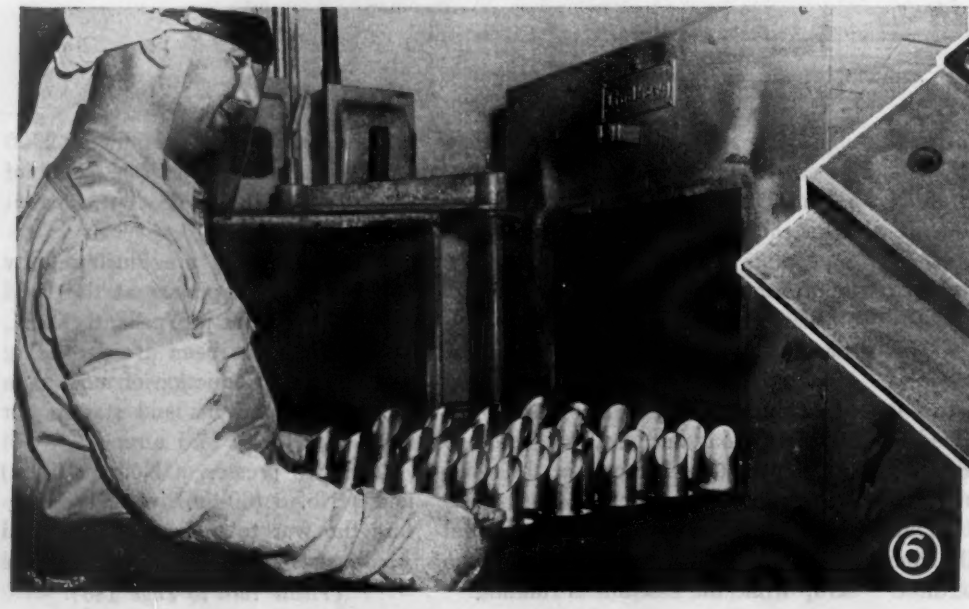
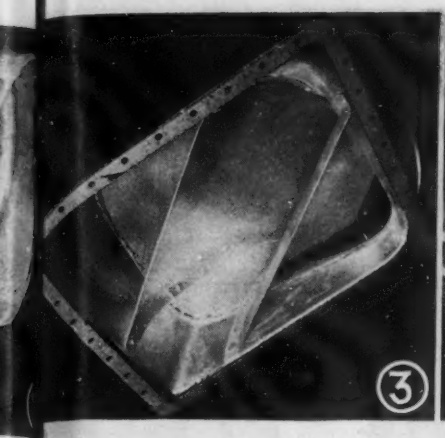


FLUX BATH BRAZING of Aluminum Parts

A resumé of a furnace aluminum brazing method resulting in accuracy and neatness of completed joints

By MAURICE BEAM
Editorial Correspondent, STEEL
Los Angeles





TWO production processes for the furnace brazing of intricate sections of some alloys of aluminum, which may be called new, are (1) those done in a standard hot air furnace, and (2) in a molten-flux-bath furnace.

Pioneer in this process has been the Aluminum Co. of America, and today it holds the basic patents on several methods. It has been reported that some 50 per cent of the effort expended in the Alcoa Research Laboratory has been directed at the development of aluminum brazing in the years since about 1937.

The following data on aluminum brazing has been briefed from information contained in the research files of the Aluminum Brazing Co., North Long Beach, Calif., as collated by Arthur H. Brown, chief metallurgist for the concern. At this firm the salt bath (flux dip) furnace method is being employed with a degree of success that leads company's owners, Mr. Brown and O. A. Smith, to the view that the flux dip bath is superior to the original and more widely used hot air operation.

Basic premises on which the company's brazing developments rest are found, of course, in the original work done by Alcoa. Additional facts, including one patentable feature to be described later in the article, are founded upon years of experiment by the members of the firm; some of this work was accomplished during Mr. Brown's association with the field division of Consolidated Vultee in Los Angeles.

By definition, aluminum brazing is the process of joining parent sections with a filler material of lower melting point in which little or none of

(*Please turn to Page* 190)

Fig. 1—Gas welded assembly as originally made

Fig. 2—Assembly redesigned for furnace brazing. This was brazed in hot air furnace. Knurled lap joints at longitudinal seams and flange provide ideal clearance control. Screw machined flange bosses also are brazed. Fins are simpler construction and slide into the skin recesses providing a locating assembly and capillary environment. Resulting structure is stronger and lighter than former assembly

Fig. 3—Bottom view of gas welded assembly. The vanes were drop-hammer formed

Fig. 4—Bottom view of brazed assembly. One boss has been omitted to show locating method in the pierced hole. After fin has been slid into place, two tack rivets hold it in position during brazing

Fig. 5—Finished brazed assembly. All photos from Consolidated Vultee Aircraft Corp.

Fig. 6—Parts are removed from the furnace and placed into water quench

Fig. 7—Tooling method used to locate the tube bevel in relation to the flange hole pattern during a light press fit assembly operation

Fig. 8—Applying flux. This step is omitted in the flux dip technique

Producing SPONGE IRON IN A ROTARY KILN

Pilot plant operated by Bureau of Mines at Laramie, Wyoming, employs coal to reduce iron in the ore to metallic form. Abrasive polishing treatment removes large percentages of impurities in granulated sponge iron. Charging and firing practices are being varied to afford lowest cost of production. Details of equipment and process are presented in this article.

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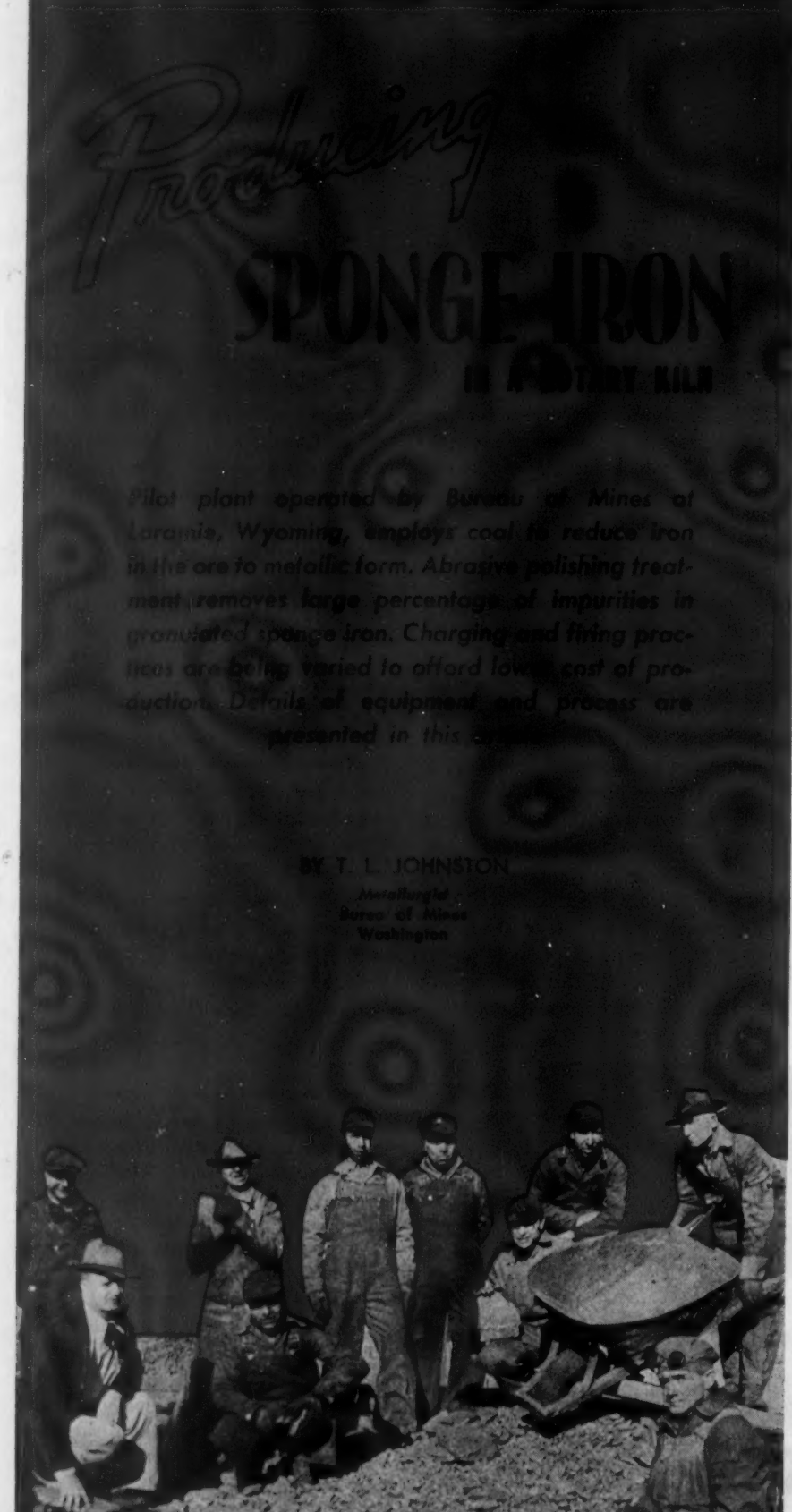


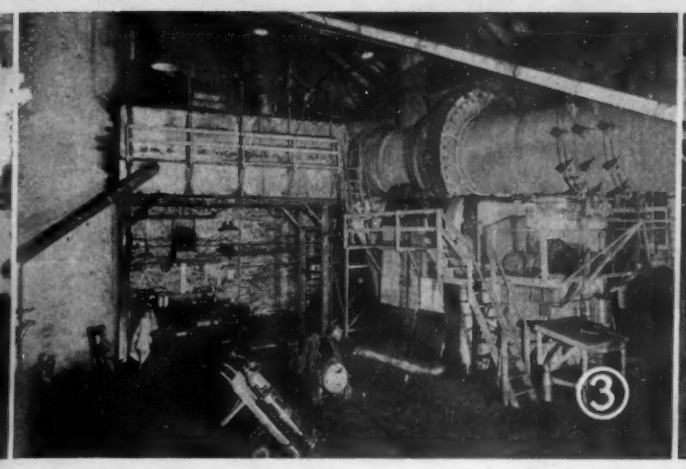
Fig. 1—Sponge iron nodules which were shipped to nearby steel plant

DIRECT reduction of iron ores to cast iron or steel is one of the oldest known metallurgical techniques, but since development of the blast furnace and open-hearth furnace, such methods have been superseded by the two-step process in which first cast iron and then steel are produced. Undoubtedly, the modern steel plant with its large blast furnaces and open hearths is the most efficient means of producing steel in regions where there is a plentiful supply of iron and coking coal. However, there are a large number of iron ore deposits, particularly in the Western States, that are too small to justify the capital outlay required for the construction of blast furnaces and too remote from existing plants to allow shipping the ore for smelting.

During the shortage of scrap iron brought on by the war production program, interest was revived in the direct reduction of iron ores as a means of increasing the production of iron and steel. The product of direct reduction is a porous sponge iron made from iron ore without melting. Various methods of making sponge iron had been devised and many processes patented, but practically all work done was on a small scale not proved commercially feasible. Reports from Germany and Japan indicated that sponge iron was being produced in those countries and used to augment their iron and steel supply for prosecuting the war. The need for further development on enlarged scale was considered vital.

The Bureau of Mines, acting under Congressional appropriation of 1942 for the investigation of sponge iron, initiated a broad investigation of the production of sponge iron, partly to provide a substitute for scrap iron and partly to permit some of the smaller, scattered iron deposits in this country to be brought into production.

Shortage of scrap iron is no longer a serious problem. However, because the larger iron ore deposits are being rapidly depleted, sponge iron processes for utilizing relatively small and scattered iron ore deposits will have equal or greater significance in postwar years.



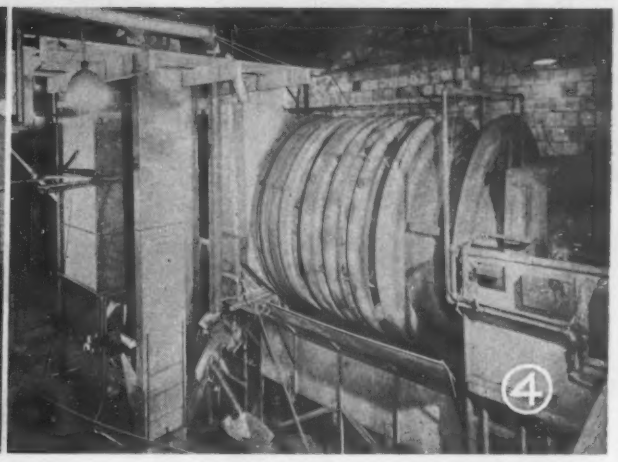


Fig. 2—Cupola in foreground; gas furnace right background

Fig. 3—Small diameter section of kiln, flue and bottom of stack

Fig. 4—Large diameter section of kiln showing spiral cooler mounted on outside

As part of the general program for the investigation of the production of sponge iron, the Laramie sponge iron pilot plant was constructed to produce sponge iron by reduction with solid fuel. It is one of the largest projects under the Bureau of Mines program and is designed to produce about 50 tons of sponge iron per day by reduction with coke or coal in a gas kiln. Design of plant was based on previous work by the Bureau of Mines in 1920 to 1924. Construction was started early in 1943 and operations in February 1944. About three-fourths of the materials and equipment required was obtained secondhand from idle cement plants, gold mills, and junk yards. Alterations and additions have been made during operations and the plant is now a complete operating unit.

Plant Structure

The plant building, Fig. 6, is located in the north part of Laramie, Wyo., and consists of an old stone structure, originally built as a glass factory, with an addition of structural steel and corrugated sheet iron and lined with building tile. The plant covers an area 230 x 70 ft. A small warehouse and garages located near the main building are included in the acre of ground occupied by the plant, all of which is Government-owned.

The stone portion of the main building is divided into two parts. The smaller part is composed of two stories containing the offices and analytical laboratory and a basement in which the sample room and electric shop are located. The larger part is one large room, 70 x 74 ft, and houses equipment for crushing screening, drying, conveying, and storing ore, coal, coke and by-products.

The structural steel addition covers an area of 128 x 81 ft and contains the rotary kiln with auxiliary equipment, a small machine shop, and an electric substation.

A spur track of the Union Pacific Railroad serves the main building on the west side. Electric power is provided by the Bureau of Reclamation, natural gas by the Rocky Mountain Gas Co. and water and sewage facilities by the City of Laramie. Outside storage space for raw materials is provided.

The most important piece of equipment in the plant is a large rotary kiln which was designed after the two-diameter kiln developed by the Bureau of Mines by Williams, Barrett, and Larsen.* Other equipment is provided to handle and prepare materials for charging into the rotary kiln and to treat products discharged from it, all arranged in a flow scheme to operate as a unit 24 hr a day. (See Fig. 7).

The rotary kiln was constructed of two sections joined; one section is 50 ft long and 6 ft diameter (Fig. 3) and the other is 30 ft long and 9 ft diameter, making a total of 80 ft. The 6-ft diameter section is lined with a 6-in. layer of firebrick and the 9-ft section with a 4-in. layer of insulating brick covered with a 6-in. layer of firebrick. The kiln is set at a slope of ½-in. to the foot and is driven by a 25-hp motor at variable speeds ranging from ½ to 2 rpm. Firing is done with either natural gas or pulverized coal. A special spiral cooler is mounted on the outside of the large diameter section of the kiln (Fig. 4). A brick-lined, concrete smoke stack 4 ft inside diameter and 120 ft high is connected to the kiln.

A small rotary kiln 19 ft long and 3 ft outside diameter placed alongside the large kiln is lined to form two sections; one section is 6 ft long and 27 in. inside diameter and the other 12 ft long and 18 in. inside diameter. This small kiln is used for preliminary tests as a guide to operation of the large kiln.

Equipment for handling and preparing iron ore, coal, and coke in carlots consists of crushers, grinders, driers, screens, elevators, and conveyors. Storage bins with a capacity of 200 tons of ore and 100 tons of coal or coke are provided. A dump truck and a tractor with a front-end loader are used to load and move materials to and from outdoor stock piles.

Equipment for handling and treating the product discharged from the kiln is arranged to separate the metallic iron from unburned coal and waste minerals and consists of magnetic separators, vibrating screens, roll crusher, a centrifugal polishing machine, and a briquetting press (Fig. 5). Bins for storing intermediate products are located in the circuit so that the various machines can be operated together as a whole unit or individually with materials from their respective bins.

A cupola furnace 3 ft diameter and a gas-fired melting furnace with auxiliary equipment are also provided (Fig. 2).

A dust-collecting system, consisting of fans, ducts, cyclone collectors, and flexible hoses, is installed to control iron and coal dust.

A sample room equipped with crushers, grinders sieves, and other equipment for preparing samples of ore, coal, and plant products is located in the plant. The analytical laboratory is equipped with laboratory-size furnaces, hot plates, and general auxiliary equipment sufficient to analyze raw materials and plant products.

Plant Operation

During the period the plant has operated, 35 separate tests ranging from three to eleven days' duration have been made in the rotary kiln. Each test was made to determine the influence of one or more of the many variables affecting the production of sponge iron. Some of the tests yielded good sponge iron and some a fair-grade product, while others resulted in the production of worthless material; all yielded valuable informa-

(*Please turn to Page* 140)

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*Williams, C. E., Barrett, E. P., and Larson, B. M., "Production of Sponge Iron," Bureau of Mines Bulletin 270, 1927.

Commends

OPEN-HEARTH STEELMAKERS

For Maintaining Uniform Quality

AMERICAN steelmakers were highly commended for their ability to supply materials of high quality and reliability by a high ranking army officer at the joint meeting of the Industrial Minerals Division, Southern Ohio Section of National Open-Hearth Committee and the Ohio Valley Section of the American Institute of Mining and Metallurgical Engineers, Deshler-Wallick Hotel, Columbus, O., November 2-3. Registration totaled 243. Next year's meeting is scheduled at this same location, Oct. 26.

Speaking only as an individual, and from the angle of the ground forces, the army officer pointed out that the uniformity of our equipment in World War II was particularly good and it showed a steady improvement as the war progressed. In his opinion, in every case, American equipment excelled that made by the Germans, in reliability and durability, and in almost every case in performance. The Panther tank, brought out by the Germans in 1944 was superior to ours in a measurable degree from the standpoint of mobility and performance, though it did not compare to ours from the standpoint of reliability. The Panther tank had a life of 50 hr operation between overhauls, whereas the American M4A had a life of 350 hr, or seven times that of the German tank. Moreover, as a useful standard, our tank has a life of 250 hr. The officer emphasized that twice in the war the reliability of tanks was a factor.

The Tiger tank was too heavy and too slow, the officer pointed out, and could be outflanked and outmaneuvered by the American tanks.

In discussing armor plate, the officer said that American material was of high quality and uniform throughout. Occasionally, pieces of German armor were found which were strong. Some of these sections could be cut like butter, whereas others required depth charges to penetrate them. German armor plate lacked uniformity, generally, he stated.

In conclusion, the officer emphasized that for the first time, the most powerful nation in the world is on the side of world peace. However, he made a plea that this country continue its research program, possess both offensive and defensive equipment to insure our ability to fight future fire, and train a sufficient number of men to assure that our fire department can move on the first alarm.

Some of the details of operating practice discussed at the morning and afternoon technical sessions follow:

Rammed Bottoms: One operator, in describing the method of installation and materials used, mentioned that the average ramming time was 34½ hr. The furnace was kept on gas for 30 hr, and then fired with fuel oil for 60 hr. The time spent burning in the burnt material, on some of the rammed material, amounted to 53 hr. The average time for ramming and charging, he stated, was 7 days. The average material used was 75 tons of ramming material, 14 tons of magnesite on top of the ramming material, and 3½ tons of slag with the magnesite. In discussing the performance of rammed material, the speaker pointed out that on one furnace the lost time amounted to 25 sec per ton, on another furnace 12.5 sec per ton, and on a third furnace, 14.2 sec per ton. This compared with an average for the shop for 16.9 sec per ton, on a campaign of 135,604 tons. The thickness of the veneer burnt on averaged from 2 or 3 in. Two of the three rammed bottoms were high in magnesium and these gave the lowest delay time.

Pouring Refractories: In discussing nozzle and stopper technique on poured refractories, one operator suggested that a good stopperhead should have the following characteristics: Low softening temperature, high density, appreciable permanent expansion at 2400°F, and good workmanship, including freedom from lamination. The speaker pointed out that every clay-graphite stopperhead made today cracks when it comes in contact with molten steel. Another operator preferred stopperheads comparable to cone No. 26, equivalent to 2900°F. Above this temperature, he stated, his shop encountered difficulty in pouring.

Vacuum Systems: At a shop in the Great Lakes district, employing this system for removing flue dust, the man-hours were cut down 35 per cent. Considerable wear at the elbows was encountered, but this was remedied by installing replaceable sections at the point of abrasion. It was brought out that the size of particles must be limited in order to avoid clogging the lines. At another plant the maximum cross section of the hunks allowed to go through the system is 4 in. The temperature at which the flue dust is moved was not stated, but the general consensus of opinion is that it can be transported satisfactory just as soon as the checker temperature will permit men to get inside to handle the dust. It was also brought out that there is no incentive in handling materials in the wet state, inasmuch as it packs at the elbow like concrete. One operator, however, stated that wet flue dust can be moved satisfactorily if extra water is used.

Molten Coatings: A heavy coating of tar applied to mold walls affords a good coating for alloy grades of steel but the tar must be applied uniformly, it was found at one open-hearth shop. Aluminum-graphite gives fairly satisfactory ingot surface, according to one operator, who is using the mix on grades of steel that have to be scarfed. Aluminum paint first was thinned with gasoline and then sprayed along with graphite. As long as the aluminum is not applied too heavily, it will not build up on the mold wall, the speaker pointed out. On plain carbon heats the speaker mentioned that satisfactory results are obtained by using a mold wash composed of graphite and water. This should be kept in air-agitated tanks in the proportion of 2 lb of graphite per gal of water. This is sprayed while the molds are hot.

Mold Life: The consensus of opinion is that the trend of mold life is beginning to increase again. Before the war, bottom pour molds at one shop had a life of 125 heats whereas during the war their life declined to 100 heats. This, the speaker pointed out, is now on the upgrade. He pointed out that cracking is the most prevalent cause of mold failure at his shop.

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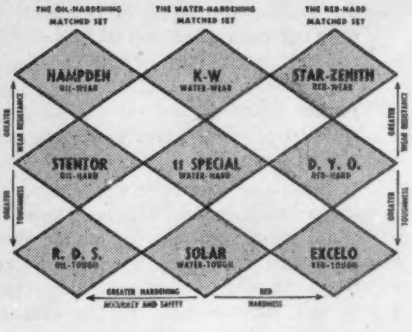

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The key steel is the one in the center, *No. 11 Special,* a straight carbon, tough timbre water-hardening tool steel. When you have a tool to make, you first find out if it should be made from *No. 11 Special.* If the answer is "Yes" you go no further. But when the answer is "No", you use the diagram to point the way to the proper tool steel for the job. For greater wear resistance you go north, etc. Just follow the diagram.

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Carpenter MATCHED TOOL STEELS

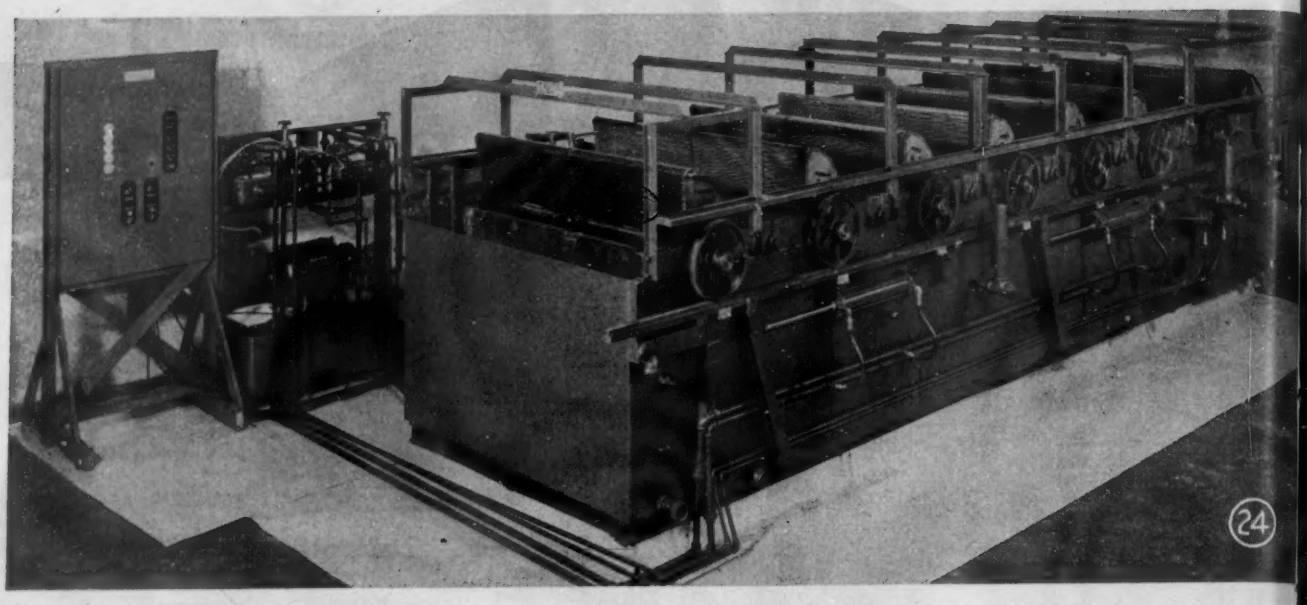

Fig. 24—One type of automatic bulk handling equipment used in chromating and Parkerizing of zinc plated parts. (Courtesy Udylite Corp.)

CURRENT Zinc Electroplating PRACTICE

Chromate, anodic and phosphate types of protective coatings for zinc plated surfaces are discussed in concluding article of six

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IN some "bright" zinc plating processes a brown surface film appears almost inevitably upon removal of the work from the plating bath. This film may be removed by use of a dilute oxidizing acid bright dip. The film, however, does not occur with some brightening agents, in which case bright dipping is optional. A second desirable effect of bright dipping after plating is to improve resistance of the zinc plate to tarnish the finger staining although zinc deposits produced from old baths free from heavy metals possess in general excellent resistance to staining. Acceptable bright dipping procedures include a 5 to 30 sec dip in 0.25 to 0.5 per cent nitric acid or acidified hydrogen peroxide[70] consisting of 0.25 per cent sulphuric acid with 4.0 per cent hydrogen peroxide.

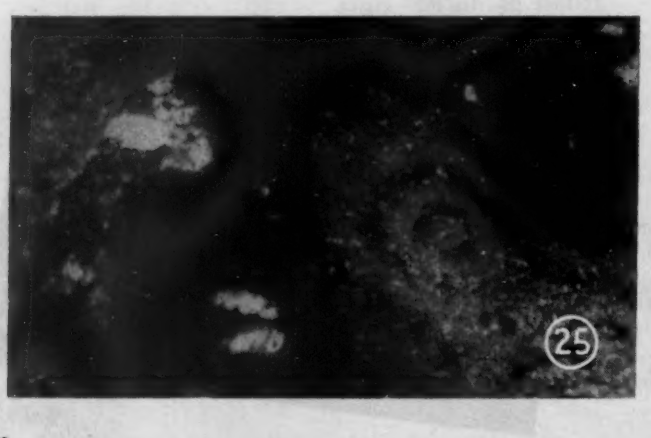
Chromate Films

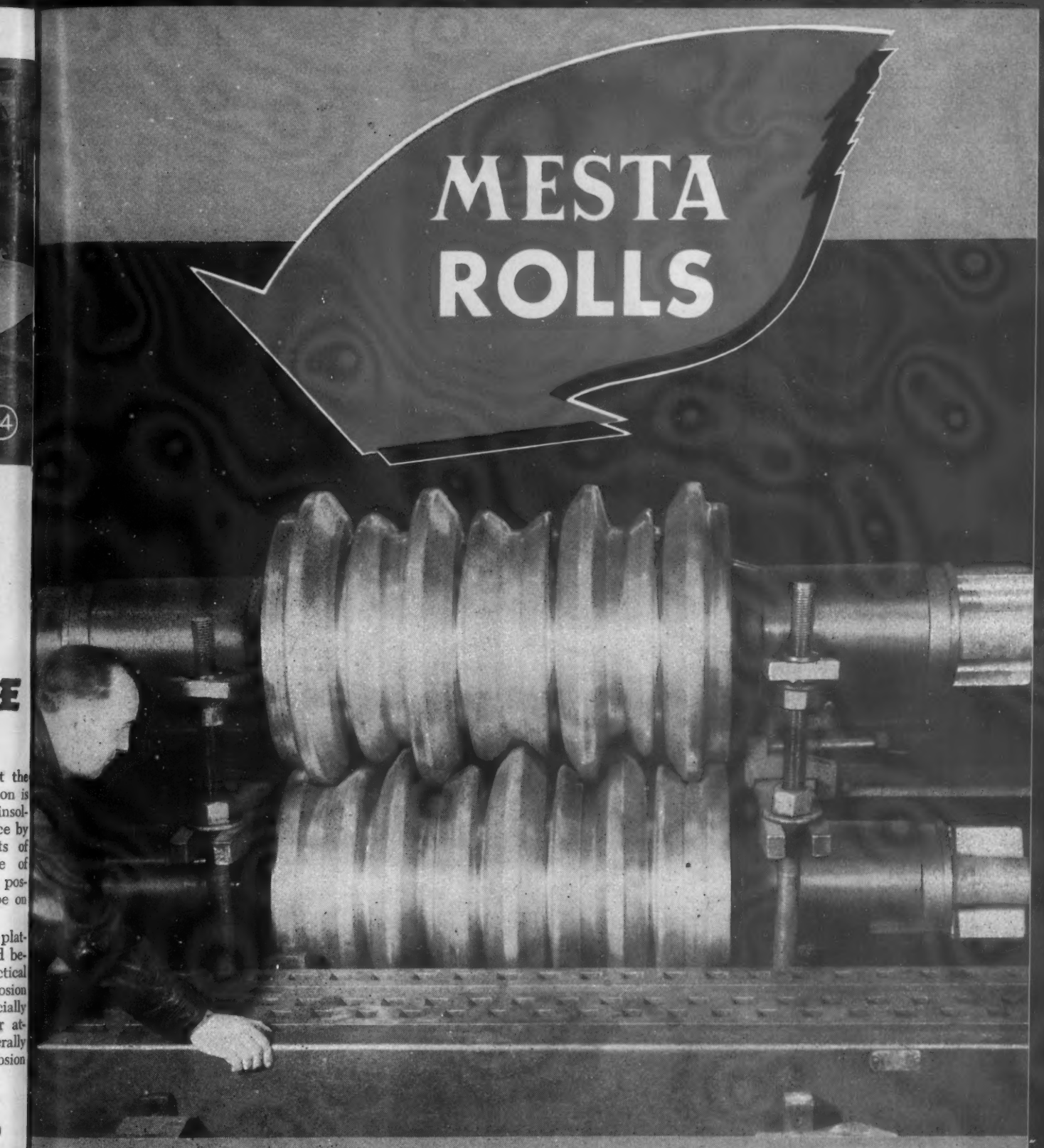
Protective coatings produced by converting the surface of a metal into a chemical compound of exceedingly low solubility in the environment to which it is to be exposed are becoming of importance and are being increasingly used. As has been previously pointed out the resistance of most metals to corrosion is due to the formation of relatively insoluble corrosion products on the surface by reaction with non-metallic elements of the surroundings. By the choice of proper solutions and conditions it is possible to produce coatings of this type on almost any metal.

With the extensive use of zinc plating on various steel articles, the need became more apparent for having practical means of retarding the white corrosion products which form on zinc, especially in salt atmospheres. In the outdoor atmosphere the exposure of zinc generally produces a thin gray film of corrosion

Fig. 25—Zinc plated steel plus phosphate coating. X300

Fig. 26—Zinc plated steel plus Jernstedt[71] predip, plus phosphate coating. X300





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products which has no real influence on the operation of the parts. However, stagnant water with limited access to oxygen, and water films which dry slowly represent a different situation. Under these conditions a non-uniform type of corrosion develops which results, in severe cases, in the formation of bulky films of white corrosion products. These films may hinder the operation of devices or otherwise be objectional. In severe cases involving zinc coatings early rusting of the underlying metal may occur. The "Cronak"[11] film process has been developed specifically to minimize this type of corrosion, and has found widespread use on zinc plated parts many of which must perform vital functions.

The normal operation of the "Cronak" process is given below: Cleaned work or work which by virtue of its past history needs no cleaning is first wet with water following which it is dipped for approximately 10 sec in a solution consisting of:

Sodium Dichromate ($Na_2Cr_2O7 \cdot 2H_2O$),
200 grams—26.6 oz.
6-9 cc—23-34 cc
Sulphuric Acid (94%-Sp. Gr. 1.84),
Water ..... 1000 cc—1 gal

The work is then removed, drained for not over 30 sec and rinsed *thoroughly* in cold running water. The water is then removed, preferably by air-blasting.

Careful chemical and physical studies of the "Cronak" film have led to the conclusion that it is a basic chromium chromate of the general formula:

$$Cr_2O_3 \cdot CrO_3 \cdot XH_2O$$

or

$$Cr(OH)_3\ Cr(OH)\ CrO_4$$

It is a characteristic of the "Cronak" film that it slowly releases its hexavalent chromium to water which comes in contact with it. It is believed that this dissolved material inhibits the subsequent corrosion of the zinc and insures that accidentally bared zinc areas are protected.

"Anozinc"[12] is a type of conversion coating which is formed anodically by treating zinc plated articles in a modified chromate bath with the use of electric current. The procedure followed is similar to that used in anodizing aluminum. Properties claimed[13] for the "Anozinc" coating are hardness and good wear resistance as compared to non-electrolytic coatings. Two types of these coatings are available, a yellow and a black. According to reported chemical studies the yellow coating appears to be largely zinc oxide and zinc chromate with some soluble chromate absorbed from the solution. The black coating is similar except that in addition it also contains basic chromic chromate. Both type of coatings retard the corrosion of zinc. The coatings as formed are reported to be non-fragile and can be handled wet or dry immediately after processing or dried using standard methods for plated parts. Of particular interest are the claims[13] that such coatings will stand flexing, forming and drawing operations satisfactorily, and are stable to heat, no tendency toward chipping or peeling, being evidenced even near the melting point of zinc.

The "Iridite" dip process[14] produces an adherent film on zinc plate and belongs to the general class of chromated zinc coatings. The finished product is covered with a corrosion resistant olive drab coating. Other colors also may be obtained. It is reported[15] that chemical studies have shown that the major portion of the "Iridite" type coating is composed of a chrome gel compound, probably lying within the group of chrome hydroxides or hydrated chrome oxides. The essence of the coating appears to be the chromium containing compound or compounds. The process by forming a continuous integrated surface film of chrome gel inhibits the tendency of zinc coatings to undergo solution thereby prolonging the life of the coating.

The phosphating of certain metals for increased paint and lacquer adherence has come into widespread use in the last few years. To manufacturers of many sheet metal products maintaining a fine appearance is a vital problem particularly in peace-time competitive merchandising. Paint, enamel, and lacquer are inadequate in themselves as a finish for articles that will be subjected to severe exposure because of the inherent tendency of the underlying metal to corrode causing premature paint failure such as chipping and peeling. The difficulty of maintaining paint and lacquer finishes is due to three main causes: (1) Corrosion of the underlying metal, (2) lack of adhesion of the paint or lacquer film to the metal and (3) the durability of the paint film itself.

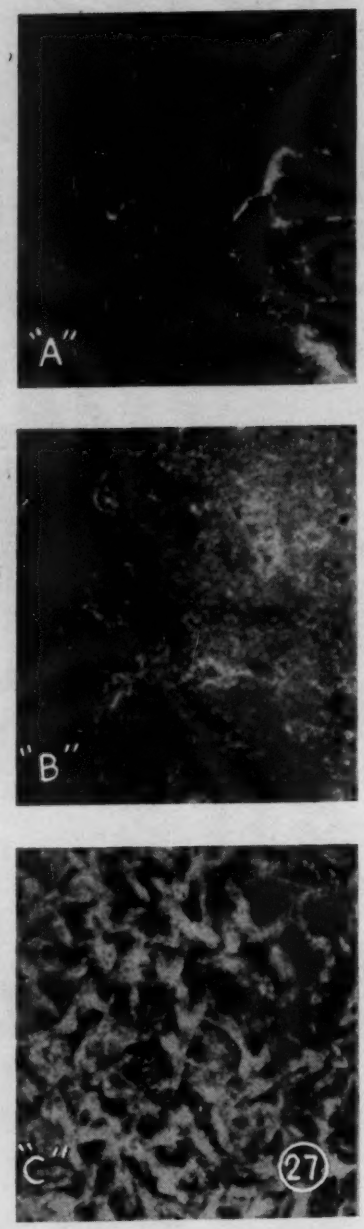


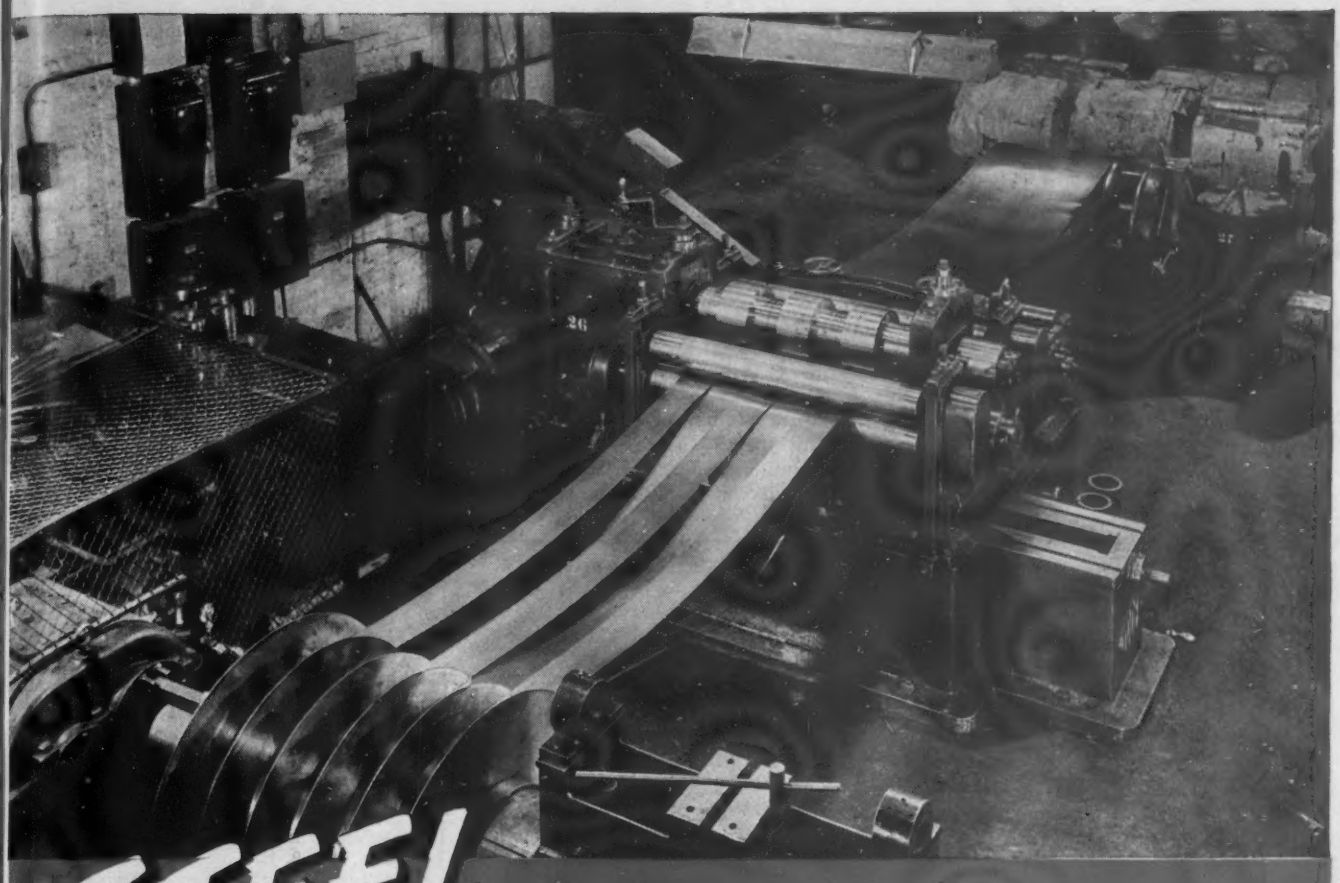
Fig. 27—Photomicrographs of zinc plated and "Bonderized" steel. A—Cold rolled steel; B—Zinc plated steel; C—Zinc plated and Bonderized steel. All X400

Phosphate Coatings

Although the phosphate method for treating metal surfaces dates back several centuries[16], the commercial development of the process is largely based on discoveries by the Parker Rust Proof Co. of the improved effect of certain additives to the bath such as manganese dihydrogen phosphate and alkali nitrates or nitrites[17] resulting in such generally used names for this type of surface treatment as "Parkerizing" and "Bonderizing"[17]. Present commercial specifications for phosphate coatings usually include a subsequent treatment such as paint, lacquer or wax. In the lacquering of straight zinc plated steel the presence of corrosion is still evidenced by the white powder formed from the zinc and by the subsequent flaking of the organic finish.

In the phosphating operation the outer surface of zinc is converted into a water insoluble phosphate coating, leaving a continuous layer of metallic zinc between the phosphate coating and the base steel for added corrosion resistance. The importance of the production of a finely grained crystalline coating structure on the surface was recognized throughout the course of development of phosphate coatings and has recently been studied in detail by Jernstedt[18]. Jernstedt claims that through the use of a special titanium dihydrogen phosphate predip prior to phosphating of zinc plated steel it is possible to increase the corrosion resistant quality of the resulting film considerably. Zinc plated parts with this finish have been used without any supplementary organic coating, and when an organic coating is applied such as lacquering, oiling, or waxing the corrosion resistance is reported to be improved over that ordinarily obtainable by phosphating.

The explanation proposed by Jernstedt[18] is that the activity of the titanium disodiumphosphate predip is probably due to the adsorption of a film containing the phosphate-ion on the metal surface prior to the treatment in a phosphoric acid bath. The titanium is supposedly present in the predip as a colloid and possibly as a complex phosphate compound. Figs. 25 and 26 show phosphate coatings produced by Jernstedt on zinc plated steel both with and without the titanium predip. As can be seen from the photomicrographs[18] the phosphate coatings appear to consist of numerous microscopic



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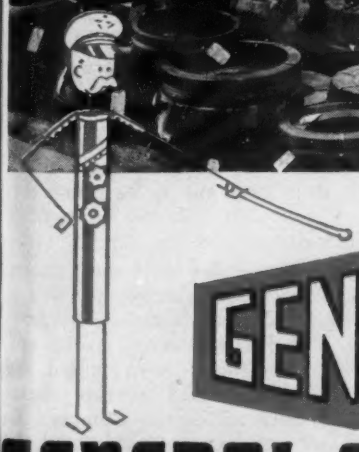

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crystals integral with the metal itself. The finishing material must apparently flow into the interstices between the fine crystals and when dry, is securely anchored to the metal.

A corrosion resistant and paint holding zinc coated sheet has been developed and is being marketed by the various steel companies under their own trade names. The product consists in the electrogalvanizing of a uniform coating of zinc approximately 0.00002 to 0.00005-in[66] thick or sometimes 0.0001 to 0.0003-in. thick on steel sheet followed by phosphate treatment using a commercial process such as "Bonderizing"[71]. The deposition of the zinc and the phosphating is accomplished by continuously passing the properly cleaned strip steel or sheets through an acid type zinc plating bath and immediately followed by phosphating and rinsing.

Such finished sheets are being produced commercially and their availability should increase as more steel and equipment is made available. Due to the thin and adherent nature of the electrodeposited coating, sheets can be drawn and articles fabricated therefrom can be subsequently painted, since the preformed phosphate coating forms a satisfactory paint base. To avoid weak spots in the paint finish due to hand marks, grease, or other foreign matter, it is important that such sheets or articles formed therefrom be properly cleaned before painting. Shipment and storage of such sheets without rusting makes them especially suitable for many uses. The improved paint holding quality of the phosphate surface and the added protection against corrosion afforded from the zinc layer beneath the paint and phosphate coating assures long service life for such finished parts. Fig. 27 shows photomicrographs of zinc plated and "Bonderized" sheet steel.

Considerable war-time savings in vital zinc resulted from the use of the process[66]. One estimate has placed the amount of zinc consumed in the coating of these phosphated zinc sheets at from 3 to 5 lb of zinc per ton of 24 gage steel as compared with conventional hotdip galvanizing sheets of this gage which requires approximately 200 lb of zinc per ton or 1½ oz of zinc per square foot of steel. It is believed that these electrogalvanized-phosphate sheets will be widely used in the industry as they become more available, resulting in considerable savings in zinc.

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REFERENCES

[70] Hull U.S.P. 2,154,451; Oplinger U.S.P. 2,154,469.

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[77] Processes of the Parker Rust Proof Co., Detroit.

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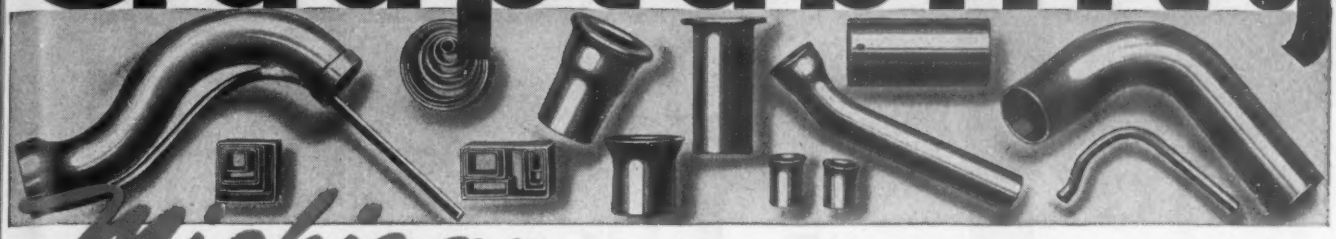
24 Holes Drilled with Two Working Stations

A machine, developed by LeMaire Tool & Mfg. Co., Dearborn, Mich., with two working stations drilled 24 holes in a heavy gun part. Standard model No. 20 vertical drilling and boring machine was equipped with a 25-spindle drill head and a 3-position, hydraulically actuated shuttle-index table, on which part was loaded in a fixture.

After being loaded in front position, part was moved into second position to have 20 holes of various diameters drilled. Part then was moved to the rear, where 4 more holes were drilled and 1 was reamed. Second working station was provided as center distances on some holes were extremely close and also because a reaming operation was required on one hole. Bushing plate on drill head had a special coolant valve and partition to allow coolant to be directed either to the front or to the rear working position when machine was in operation

Adaptability



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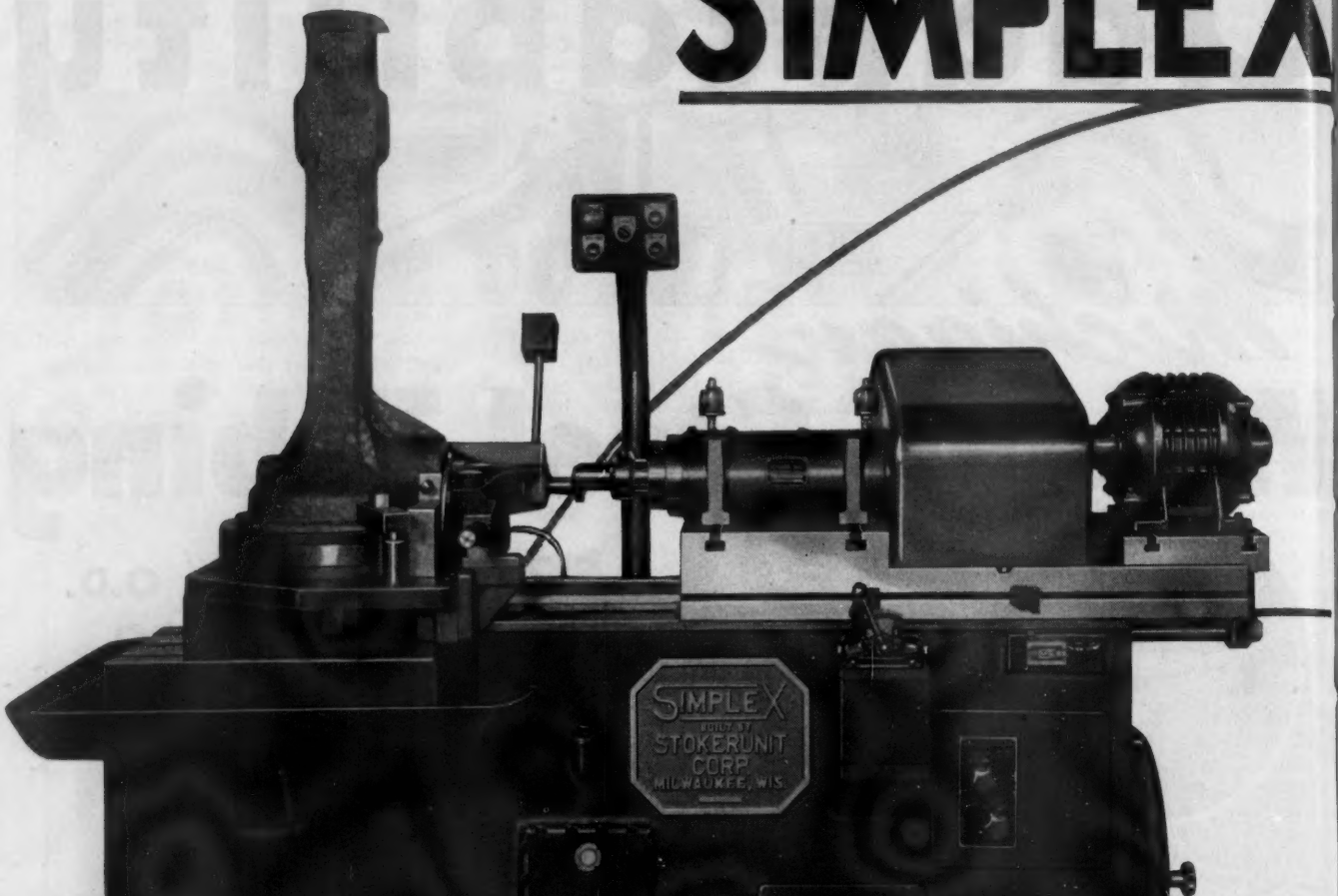

Bulky and awkward pieces are difficult precision boring jobs. Couple this with the necessity of locating from previously machined surfaces and for handling several sizes and types of pieces in the same fixture and you have a boring problem.

This SIMPLEX 2U Single-end Precision Boring Machine was tooled for pinion bearing bores in rear axle sections and it was necessary to locate from the differential joint surface and the previously finished face on the boss. The low base of the machine made it possible to use an ample size fixture without raising the piece beyond a convenient operating height, and a dial indicator type gauge provided to give correct reading of the alignment was adaptable to all of the several pieces handled.

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GIANT BORING BAR

New installation yields accuracy to within 0.0005-in. in boring 13-ft diesel engine frames

RECENT development in precision machining is the installation of a giant boring bar capable of boring 13 ft diesel engine frames within a plus or minus tolerance of 0.0005-in. This boring bar, one of the largest in use, is said to be a potent factor in arresting vibration, reducing engine noise and generally prolonging life and efficiency of diesel engines.

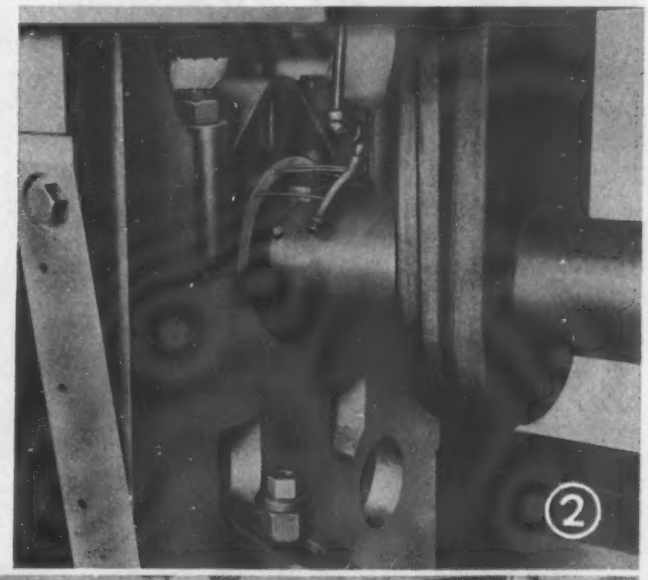
Although a bar of any size can be used on the new borer, it is now doing a precision job in the Grove City, Pa. plant of Cooper Bessemer Corp., on engines which call for a hole 8½ in. in diameter through the 13 ft frame.

Borer consists of two principal parts: Driving mechanism and bar, together with the locating support which can be any size designated. It is operated by one man, whose ability to properly set up the bar is responsible to a great extent for the precision accomplished. At times, a helper is employed to assist in setting up the larger jobs.

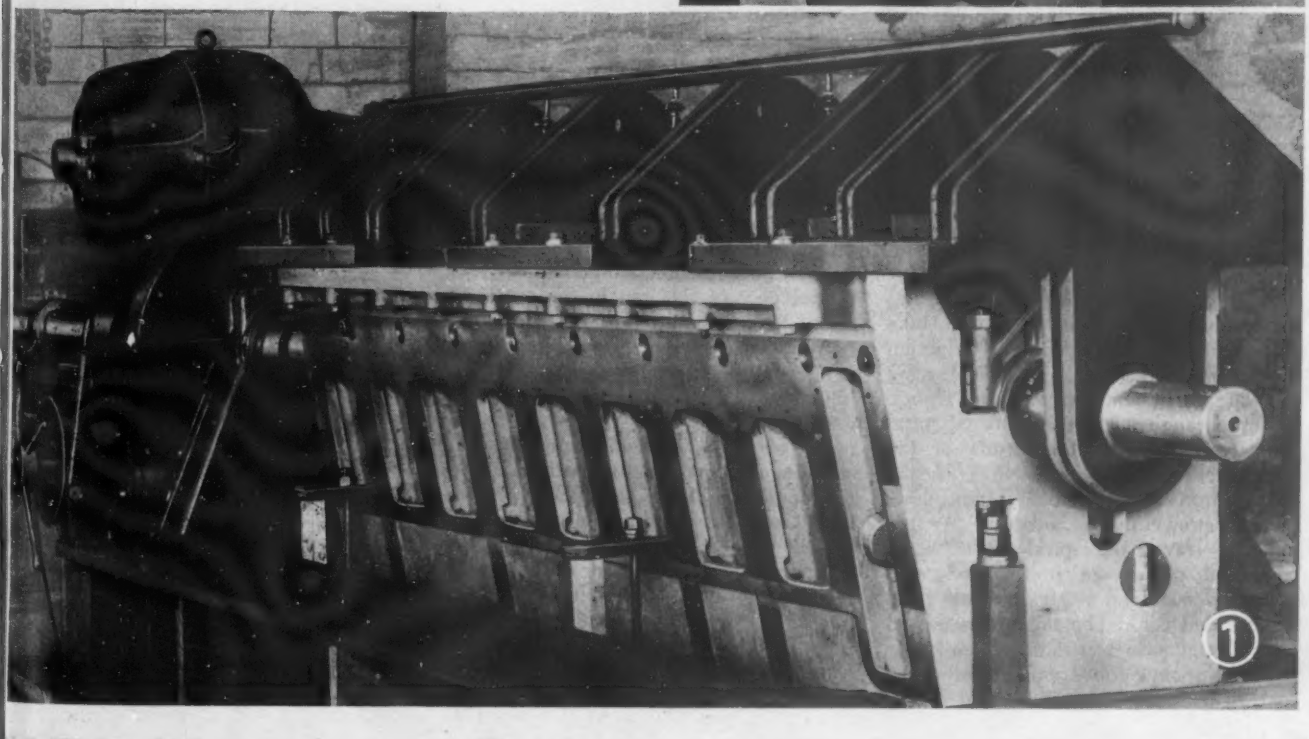
Because of its large size, it operates only horizontally in boring larger engines. Separate bars are made for each engine and are clamped to the engine bed and are driven by a floating drive.

The new boring machine came into use when demand for greater accuracy in machining was required for war equipment. Then as now, this method of boring greatly reduces time and skill required for servicing engines in the field, particularly in connection with the inter-changeability of bearings, and it permits carrying of higher loads which in turn reduces overall size of unit. It is largely responsible for increased horsepower in the recent automotive type of engines.

Right — Detail view of boring bar support shows single-point boring tool and piping for distributing cutting oil



Below — View of new boring machine showing mechanism which drives boring bar through engine frames



Producing Sponge Iron

(*Continued from Page* 129)

tion applicable to sponge-iron production in a rotary kiln.

Plant operation consists essentially of heat-treating a mixture of iron ore and coal in the rotary kiln; the carbon of the coal combines with the oxygen of the ore, producing a reduced, or metallic product. Ore and coal are each ground to ⅛-in. size, mixed in desired proportions, and charged to the cold end of the kiln in a continuous flow at 1 ton per hour. As the charge is moved forward by the revolving motion and slope of the kiln, it becomes heated, the temperature increasing as it passes forward through the small-diameter section. On reaching the large-diameter section where heat from a gas burner is at a maximum (950 to 1000° C), the rate of forward movement of the charge is retarded and the layer of charge is deeper, thus providing conditions of time and temperature for chemical actions to take place that are necessary for the reduction of iron oxide to sponge iron. On leaving the large-diameter section, the charge passes through a grating into a spiral cooler mounted on the outside of the large section of the kiln to cool the sponge iron in a reducing atmosphere, thereby preventing reoxidation. As the material leaves the spiral cooler, it is composed of sponge iron mixed with unburned coal and waste minerals from the ore and coal. The mixture is passed over a magnetic separator which separates the sponge iron from the unburned coal. The sponge iron is cleaned of adhering particles of impurities by treatment in a roll crusher, a centrifugal polisher, and a final magnetic separator. The cleaned product is a granular sponge iron that can be briquetted or used in the granular state for making steel. The unburned coal is returned to the beginning of the circuit and reused.

Success of the operation depends largely on the conditions maintained in the large-diameter section or reducing zone of the kiln. The temperature, rate of feed, ratio of coal to ore in the kiln feed, quality of ore and coal, air introduction, and draft all influence operating conditions, and these factors must be kept balanced to obtain optimum results. When out of balance, operating conditions are upset, with the result that the charge in the kiln becomes semi-fused and sticks to the kiln lining in the form of rings or discharges from the kiln in an unfinished state. When optimum conditions are maintained, at least 90 per cent of the iron in the ore is reduced to metallic iron without difficulty.

Iron ore (hematite) from the Sunrise mine near Guernsey, Wyo., and a subbituminous coal from Hanna, Wyo., were used for the first tests in the plant. The coal contained a high percentage of volatile carbon which interfered with the operation of the kiln, so a preliminary treatment eliminating most of the volatile carbon was put into practice whereby a char was made and used as a reducing agent with the ore. The iron ore was readily reduced to sponge iron, but the waste minerals of the ore were so intimately mixed with the sponge iron that separation was difficult and incomplete. Operation of the rotary kiln therefore was varied and conducted at higher temperatures with the result that the sponge iron formed into pellets and nodules which were discharged, quenched, and cleaned of slag by tumbling in a barrel. This method of operation proved more corrosive to the kiln lining than lower-temperature operation.

A carload, 54 tons (Fig. 1), of cleaned pellets and nodules of sponge iron was shipped to a nearby steel mill where it was substituted for scrap iron in the charge to an open-hearth furnace and made into regular commercial steel. In making steel from this iron no special advantage or disadvantage was noted except that an inferior product requiring less preparation would have served equally as well.

One of the main problems in the manufacture of sponge iron is the elimination of sulphur from the final product. All iron ores have a small percentage of sulphur, usually not enough (over 0.05 per cent) to be harmful, but occasionally in amounts large enough to make the ore unsuitable for steelmaking. Also, all coals contain various amounts of sulphur. In making sponge iron with coal the tendency is for the iron to retain its original sulphur and absorb some from the coal.

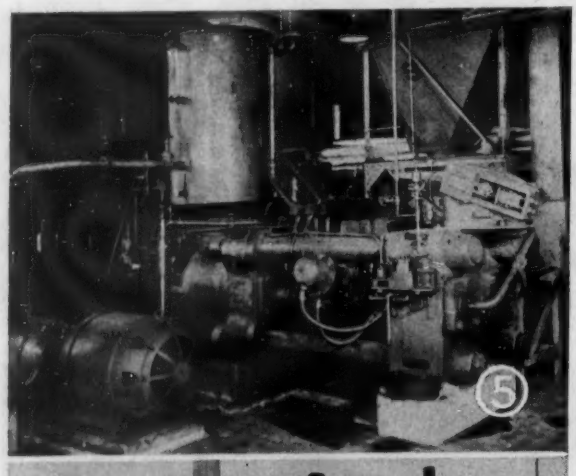


Fig. 5—Hydraulically-operated press which is employed for making briquettes

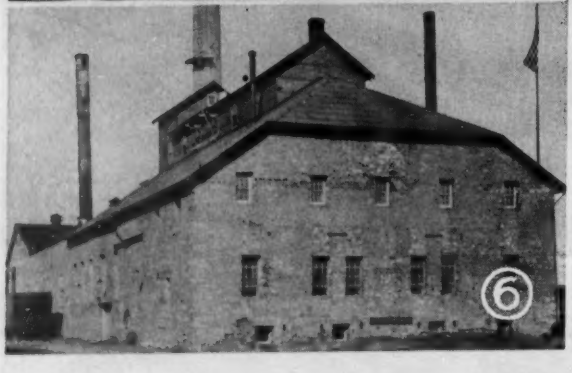


Fig. 6 — Southwest view of main building of Laramie sponge iron pilot plant

Problem Continues Unsolved

Various methods have been tried and some success attained in eliminating sulphur, but the problem has not been completely solved. Recent tests on a high-sulphur iron ore from California showed that approximately 75 per cent of the element could be removed by injecting air into the small-diameter section of the kiln and roasting off the sulphur. Use of various amounts of limerock in the charge to the kiln has been tried and found to be somewhat effective. Abrasive treatment of the sponge iron followed by magnetic separation removes approximately one-half of the sulphur and waste minerals. While progress has been made in eliminating a large part of the sulphur, no positive method has been developed which gives promise of being applicable to all ores and coals.

General practice of charging a mixture of iron ore and char made from coal into one end of the rotary kiln and firing with natural gas at the opposite end has been varied to a procedure in which the ore alone is charged into the cold end and granular coal is blown into the firing end. By blowing a granular coal, heat is supplied from the burning of the volatile carbon, while the fixed carbon or char drops out of the blown stream to the ore charge and in mixing with it acts as the reducing agent and produces sponge iron. This method has been tried and proved partly successful and is being experimented with further because of the possibilities of making sponge iron at a low cost. It is especially applicable where low-grade coals are

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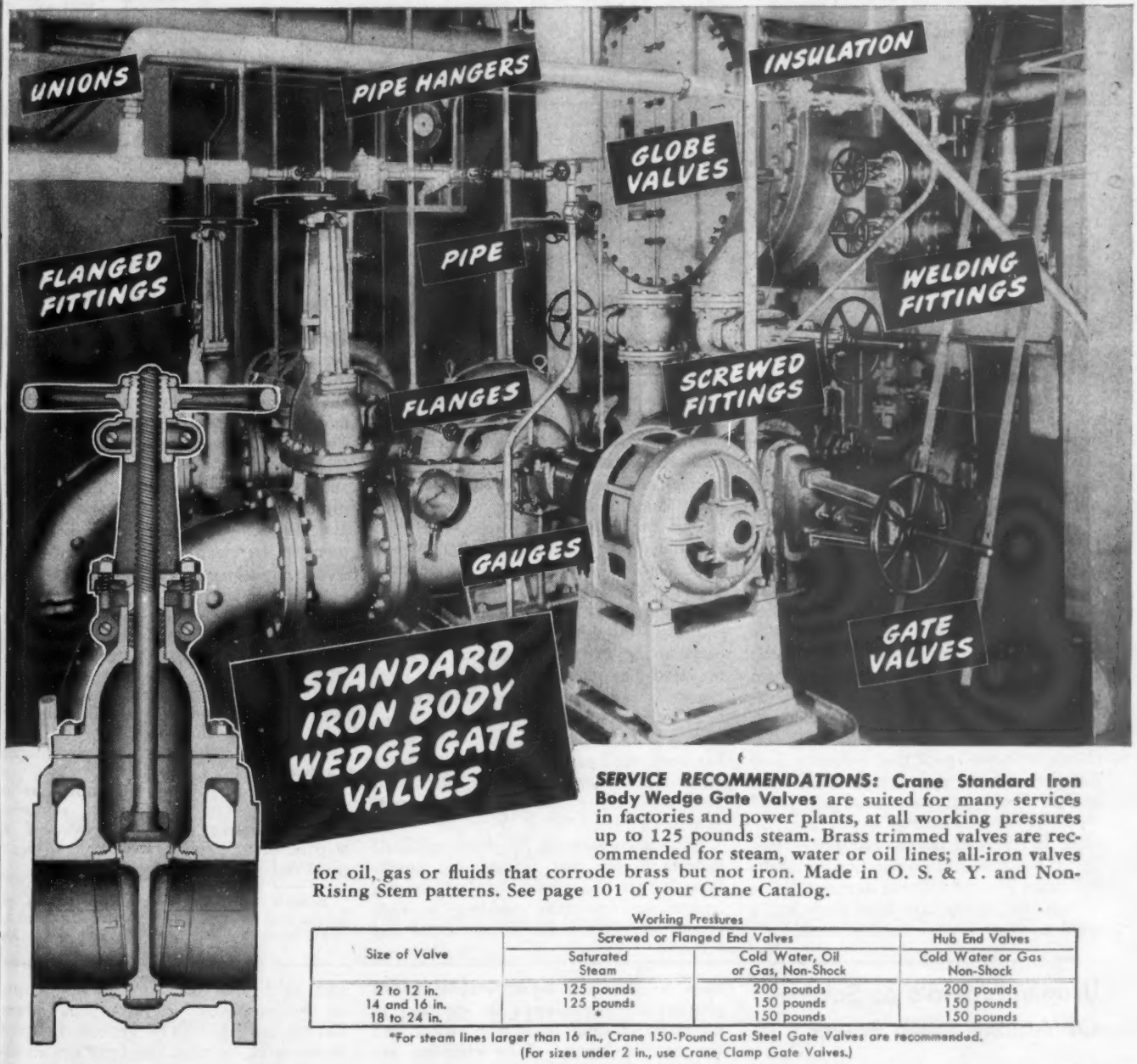
Condenser and circulating water pumps in power plant



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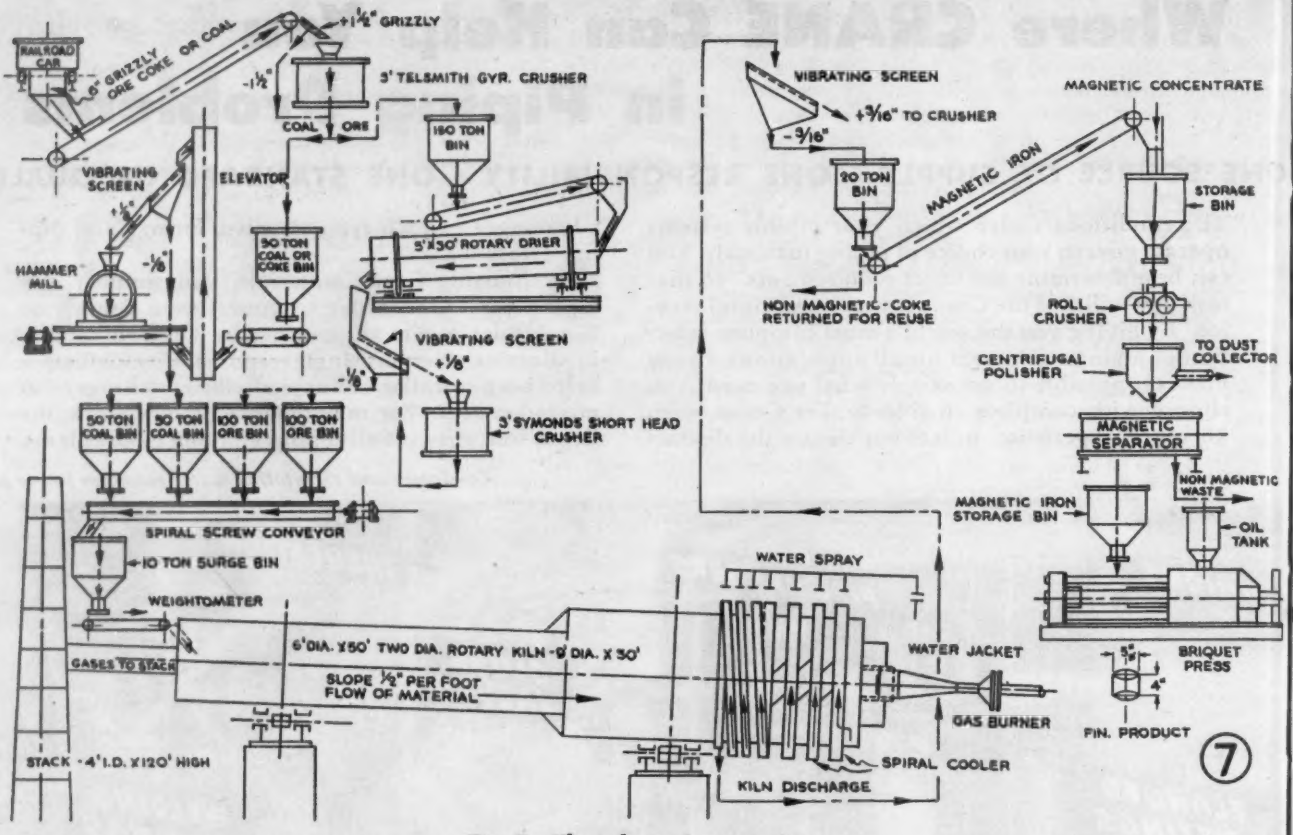

Fig. 7—Flow sheet of sponge iron process used at Laramie, Wyo., pilot plant

abundant and oil or gas not available.

Sponge iron as produced in this plant to date is not a finished product physically nor chemically. Impurities such as silica, carbon and sulphur are higher than permissible in most marketable iron and steel, so a subsequent melting and refining step is necessary. As melting stock for a refining furnace, sponge-iron nodules are more acceptable from the handling viewpoint than the granular type. Since granular sponge iron can be made with less difficulty and can be cleaned more thoroughly than nodules, more of it has been made. In order to have a more acceptable product that is easily handled, the granular sponge iron was pressed into briquettes. Considerable test work was done on briquetting in various types of briquetting machines, with the result that a press is now installed which makes cylindrical briquettes 5 in. diameter, 4 in. high, and weighing approximately 8 lb (Fig. 5). Over 100 tons of briquetted sponge iron have been made in preparation for melting in an electric refining furnace. Some of these briquettes have been made into a good grade of electric furnace steel.

Employes at the plant consist of six clerical and technical people, three watchmen, six skilled maintenance men, and an operating crew of 16 laborers, helpers, and operators, totaling 31 people. Three 8-hr shifts are worked most of the time.

Summary: The Laramie sponge iron pilot plant, consisting of a large two-diameter rotary kiln with auxiliary equipment, is a complete flexible operation station of the Bureau of Mines. It was built under wartime conditions and has operated periodically over a year, during which time a series of 35 tests has been conducted in the rotary kiln. Information from previous small-scale work has been used as a guide, but the larger scale of these operations has introduced new problems currently under investigation.

Experimental work has been confined to establishing and maintaining conditions within the rotary kiln whereby a continuous operation yielding a high grade product can be demonstrated and applied generally to any iron ore and coal.

Both nodular and granular sponge iron have been produced. A carload of the nodular type was shipped to a nearby steel mill, where it was substituted for scrap iron in the open-hearth charge and made into commercial steel. A supply of granular sponge iron was polished and briquetted in preparation for shipment to an electric furnace plant.

Accomplishments of the plant to date are as follows:

1. Considerable information has been gained on the use and limitations of a rotary kiln in the manufacture of sponge iron.
2. The method of charging ore into one end of a rotary kiln and blowing fuel for heat and reduction into the opposite end offers greatest possibilities for low costs.
3. A large part of the impurities in granular sponge iron can be removed by an abrasive polishing treatment, a step heretofore not known to have been practiced.

Editor's Note: Other important articles on sponge iron were presented in STEEL, April 9, 1945, page 106; and June 25, 1945, page 122.

Uranium Metals as Source Of Atomic Bomb Power

Uranium and Atomic Power, by Jack De Ment and H. C. Dake; cloth, 342 pages, 5½ x 8½ inches; published by Chemical Publishing Co. Inc., 26 Court St., Brooklyn 2, New York, for $4.

This is the second edition of this work, made timely by success of the atomic bomb. It is a clearly written, practical book to give the layman, student and chemist all the information essential to an understanding of atomic power and the atomic bomb. Two chapters are devoted to occurrence and properties of uranium minerals and two others to their qualitative and quantitative analysis. The remaining chapters discuss the chemistry and physics of uranium and specific methods in uranometry. There is a new section on the atomic bomb.

The first edition was issued in 1939 and in the 6 years intervening many of the prophecies as to atomic power have come true. The authors believed that a work on uranium, from the standpoint of atomic energy, would serve to integrate essential facts for the physicists, chemists and engineers who might be called on to engage in accelerated search for an atomic explosive and with that end in view the book was originally written. Thus, both the interests of scientists and lay public are served.

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COLD Riveting

FOR MAXIMUM STRENGTH

Superior physical characteristics and lowered costs attained through elimination of heating

Fig. 1—Hole completely filled by expansion of shank of ⅞-in., 6-in. grip rivet

Fig. 2—Girder fabricated entirely by cold riveting at Fort Pitt Bridge Works

ENGINEERING advantages resulting from driving large rivets cold have been recognized for a number of years by many engineers and fabricators. In this process it is desirable to limit and automatically control the driving pressures. This affords an opportunity to prevent over-driving which otherwise might cause warpage and require straightening.

Control of the speed of the riveter is also important, so that small rivets can be successfully driven with smooth action of riveter without ejecting rivet from the hole before it is driven.

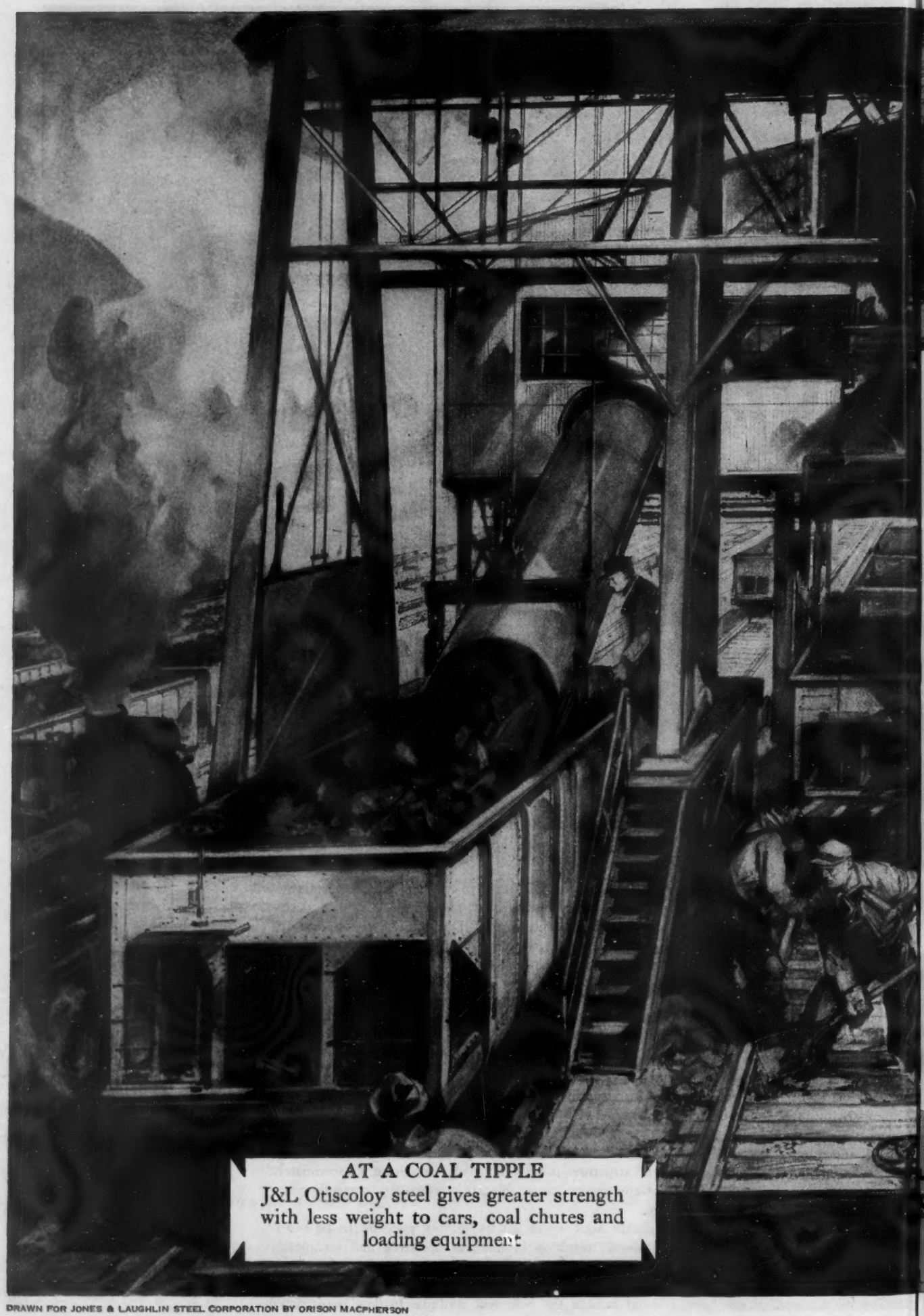
Use of standard structural grades of rivet steel is satisfactory, and eliminates need of special rivets which would duplicate stocks and cause confusion in the shop.

Driving large rivets cold increases tensile strength somewhat and yield point greatly over that of the undriven rivet. Reduction of area and elongation are reduced to some degree but still are in excess of requirements for structural material in which the rivets are driven. Accompanying table shows change in physicals of ASTM-141 steel rivet ⅞-in. size, cold driven under pressure of 66 tons. See Fig. 3.

By accurately controlling pressure, rivets of small diameter can be safely driven on large riveters without damaging the rivet or structure—i.e., ⅝-in. rivets requiring approximately 18 tons to drive cold can be satisfactorily driven on an 80-ton machine by controlling the pressures accurately and automatically.

Shank metal is elastic up to its elastic limit which allows driving pressure to be transmitted through entire length of rivet shank, resulting in uniform upsetting and completely filled holes. When unit driving pressure reaches the elastic limit of the metal in the shank, it will begin to swell, and as pressure builds up, the shank metal flows diametrically until restricted by the wall of the holes. Metal outside the hole will continue to flow unrestricted

Fig. 3—This ⅞-in. rivet of ASTM-41 steel was cold driven at 66 tons pressure



AT A COAL TIPPLE

J&L Otiscoloy steel gives greater strength with less weight to cars, coal chutes and loading equipment

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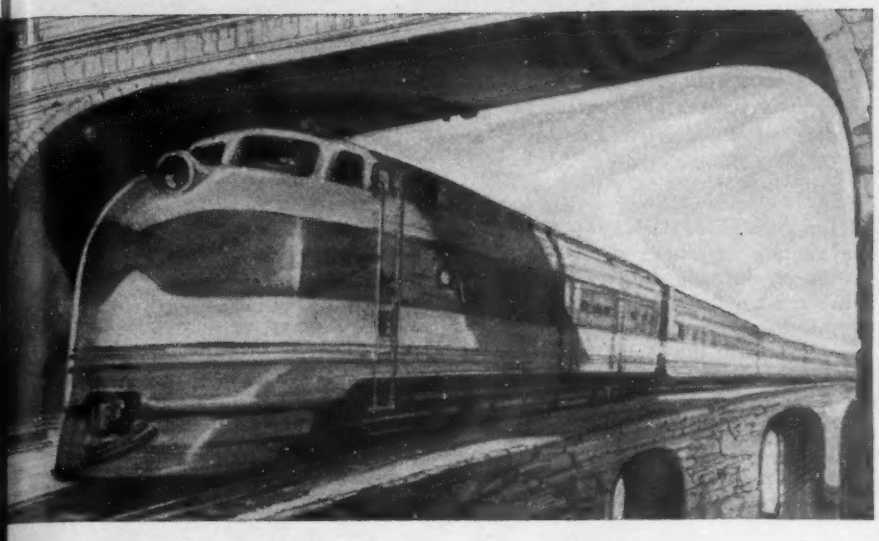

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On account of its greater strength and lighter weight, Otiscoloy reduces deadweight by 25%. It also lengthens the life of equipment from four to six times by its resistance to atmospheric corrosion and by its greater resistance to abrasion. To the manufacturer of transportation equipment, Otiscoloy steel offers an easily workable material, for it can be readily formed, either hot or cold, on present-day presses and has excellent weldability.

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Otisccloy (pronounced O-*tis*-co-loy) was developed in and named for J&L's Otis Works, Cleveland. This special steel is also produced in other J&L works as continuous sheets and as bars of varied forms.

Coal still king on R.R.'s as biggest, cheapest source of primary energy for locomotive power. Through Bituminous Coal Research, Inc., several big rail carriers are conducting research toward development of (a) gas turbine locomotive using coal as basic fuel, and (b) high-powered steam turbine-electric locomotive, burning coal.

When you compare watches with train conductor, his is correct, for it must be kept within 30-second variation per week.

"Riding the gravy train," an expression that may lack elegance, aptly describes the gain in revenues enjoyed in the operation of trains made up of equipment fabricated from Otiscoloy, the J&L high-tensile steel that reduces deadweight by 25%. In an average hopper car the saving Otiscoloy affords gives a net gain in the payload of 11,000 pounds, or 5½ tons. In a 100-car train, this amounts to some 550 tons, which is quite a ladleful of "gravy" in revenue.

R.R.'s carry 72% of ton-miles handled by all carriers, including water, motor, pipe line and air.

Europe needs million freight cars, American army transportation experts estimate, many thousands of which will be constructed of light, strong, high-tensile American steels.

"T"-rail, hook-head spike, fish plate were invented in 1830's by Robert L., son of John Stevens, builder of 1st U. S. locomotive.

½ ton more pay freight can be hauled when you operate a large truck made from Otiscoloy, for this is the average saving afforded by this J&L high-strength steel.

Brake wheel frames on every great bomber in our huge sky fleet and on many other of our fighting aircraft, were made of Otiscoloy, to save weight and add strength.

When bumpers were just leaf springs, their simple shape made processing easy. They were hot formed, ground and polished, then plated. However, the hot forming process became complicated when deeper, more intricate bumpers with end extensions were made. The spring steel distorted noticeably on cooling, requiring more grinding and hand work before plating. As a result, companies designing cars with heavier bumpers began to look around for stronger, lighter, more workable steel, such as Otiscoloy, and the trend toward high-tensile steels for this use seems assured.

Fig. 4—Detail of same girder as in Fig. 2 showing flat and button-head rivets employed. All photos and data courtesy of American Institute of Bolt, Nut, and Rivet Manufacturers

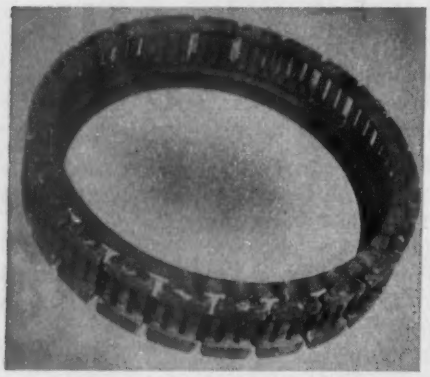
PHYSICALS OF ⅞-IN. RIVET	As Rolled	Cold Driven
Tensile Strength, psi	57,000	68,000
Elastic Strength, psi	34,000	57,000
Reduction of Area, %	71	67.1
Elongation, %	42	29.3

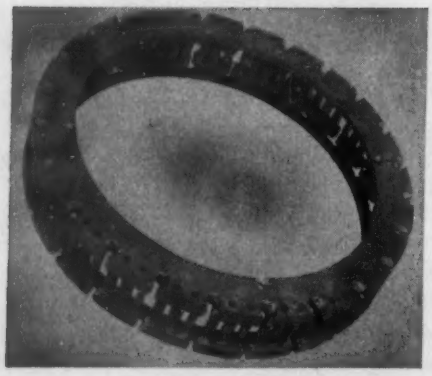
and form the driven head, at the same time causing expanded shank to exert pressure on the hole wall.

Rivets cold driven under controlled pressure have no perceptible temperature shrinkage of the shank, either longitudinally or diametrically. They are in true shear and bearing, and do not become loose or leak from vibrating loads or shock; severe strains will not cause looseness, as holes are completely filled.

Caulking of cold-driven rivets against leaks is not necessary as rivet completely fills the hole, and the countersinking effect around the hole's top edge forms a perfect seal. Holes in unusually long grips are as well filled as short ones, and require no greater pressures to drive.

Manufactured heads may be button or standard flat. Driven heads should be flat and of standard dimensions, so as to develop ultimate strength of the rivet shank. All rivets used for cold driving must be in annealed state.





Increased Resistance To Wear Achieved by

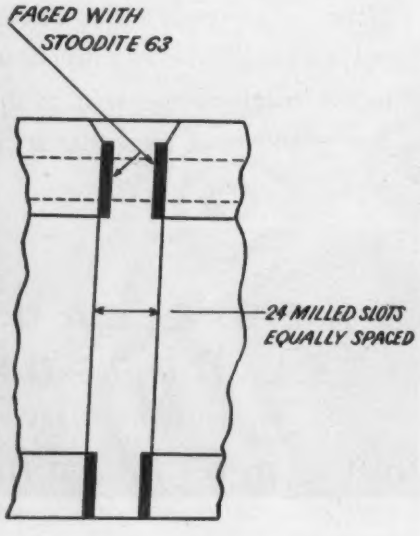
Hard Facing

FABRICATION of the inspection cages (machined from steel forgings and hard faced at points of wear), shown at left below, involved an interesting application of hard facing. Each of the cages will hold 24 cylindrical parts for inspection.

The body of the cage is made from a forged ring 17¾-in. OD, 13-in. ID and 3 1/5-in. thick. This ring is machined to the shape shown in center photo at left, a top view showing shape of cage, and points of application of hard facing. It provides 24 equally spaced slots reamed on the top portion, and drilled below. These openings receive the parts to be inspected. It is important to preserve the dimensions of these openings by preventing wear. Therefore, a hard facing operation was prescribed for the areas indicated by the heavy shading in diagram at right below, a sketch of a section of the slot. The heavy area indicates the location of hard facing deposits.

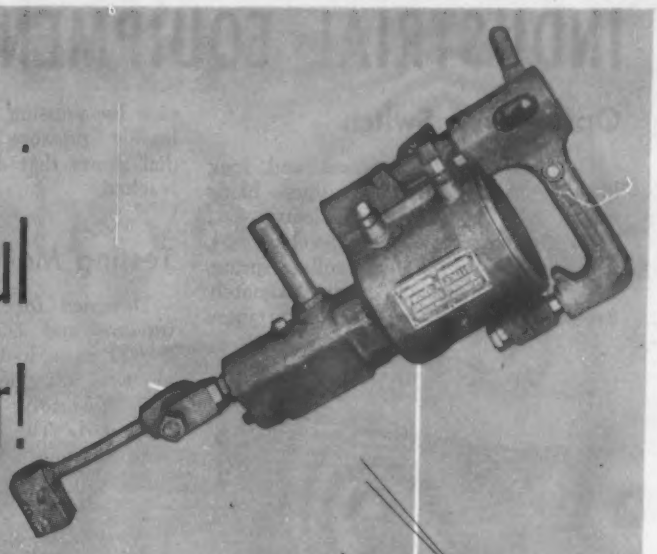
The hard facing was done with Stoodite No. 63, applied by gas welding. This alloy flows freely and forms a smooth deposit which is extremely wear resistant, which characteristic determined its suitability for the particular purpose of maintaining the correct dimensions. The bottom of the cage was formed by welding on an annular disk cut to the shape shown top photo at left, a bottom view after the stiffening ring has been welded in place. The result of this construction is an inspection tool which made it possible to check dimensions of small parts very rapidly.

Welding equipment used was made by C. E. Phillips & Co., Detroit 8.



magnesium made it possible . . .

bigger, more powerful —yet 18% lighter!



He was up against a real problem, the manufacturer of this locomotive grease gun! His product needed more power, strength, size. But any additional weight would have been a prohibitive penalty. Magnesium licked the problem—and brought the weight *down* 18%!

It's a product story that illustrates the kind of weight-saving job—often with *added strength*—that magnesium is doing today for many products, in both consumer and industrial fields.

Here's what The Prime Manufacturing Company, the producer, has to say:

"We now have a cylinder body much larger than the old style . . . able to develop 17,000 pounds pressure per square inch at the bearing.

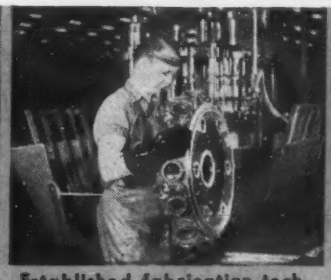
"We use not only a magnesium cylinder body but a magnesium cylinder body cap and a magnesium handle. The total weight of the enlarged grease gun is now twenty-six pounds—six pounds lighter . . ."

Ready . . . to make products move!

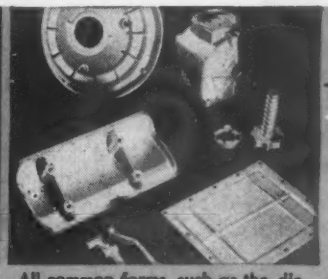
MAGNESIUM

LIGHTEST OF ALL STRUCTURAL METALS

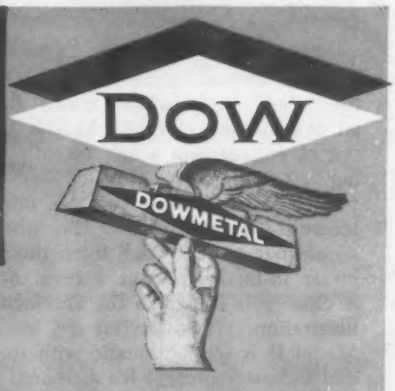
Magnesium production, from both brine wells and sea water, is abundant. Dow is the pioneer and foremost producer in the field.



Established fabrication techniques, backed by 29 years of Dow experience, are used by plants throughout the nation.



All common forms, such as the die castings shown here, are standard production items in the fabrication of magnesium parts and products.



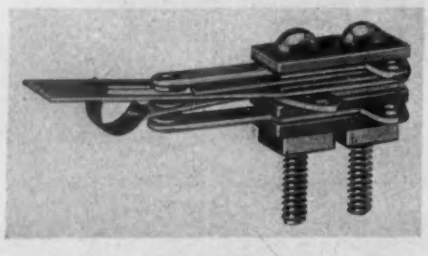
MAGNESIUM DIVISION • THE DOW CHEMICAL COMPANY, MIDLAND, MICHIGAN

New York • Boston • Philadelphia • Washington • Cleveland • Detroit • Chicago • St. Louis • Houston • San Francisco • Los Angeles • Seattle

INDUSTRIAL EQUIPMENT

Open Blade Switch

Designed for compactness and long life, a small single pole open blade switch is offered by Acro Electric Co., 1323 Superior avenue, Cleveland 14. Engineered with beryllium rolling spring, the overall dimensions are approximately 2 3/32 x 10/16 x 31/32-in. Contact arrange-



ments are for normally open, normally closed or double throw circuits. Being an open blade switch, the means of actuation is provided by the user. Standard operating pressure at end of the blade is 3 to 6 oz and it is rated at 15 amp, 115 v ac.

Dressing Device

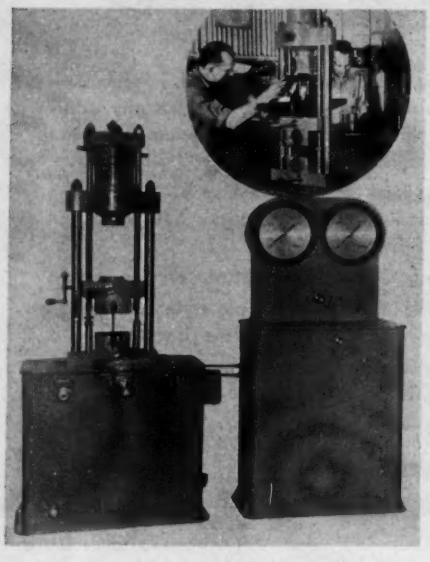
Sheffield Corp., Dayton, O. offers a powered crush dressing device for use with model B Thompson surface grinder. It is mounted on the wheel head slide. A 1/3 hp gear head motor is directly coupled to a grinding wheel spindle at

the rear of the housing and this drives the wheel at crushing speed through an overrunning clutch, which is thrown out of engagement when actually grinding.

One of the features of this device is feeding the crusher into the wheel by an electric motor which turns the micrometer in-feed screw at a constant rate. A closeup is shown in the accompanying illustration. Two styles are available: Model B is semiautomatic with the feed dial indicator present for a desired depth of automatic in-feed of the crusher roll; with model A the operator controls device by pressing a pushbutton and releasing pressure when feed indicator dial shows that desired depth has been reached.

Testing Machine

Designed for the making of tensile, traverse and compression tests up to 60,000 lb, a hydraulically operated machine is introduced by Steel City Testing Laboratory, 8843 Livernois avenue, Detroit 4. The piston and cylinder are a lapped finish, fitted without any packing and allowing for a minimum of fric-

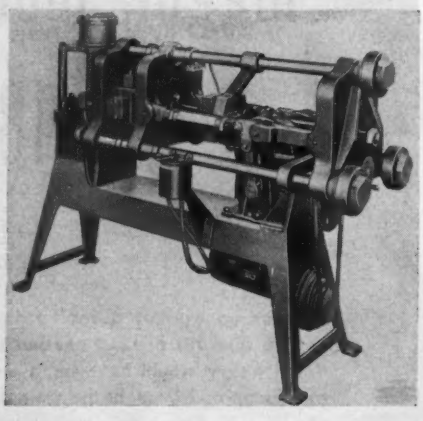


tion. Pulling head unit thrust is taken on a large steel ball and socket which allows head to float. Upper and lower pulling heads are of conventional type with wedge-type jaws for both flat and round specimens. Holders are also available for shoulder and thread end specimens. A suitable load regulating valve is provided which will maintain a uniform load rating. Gages are provided with maximum pointers and are fully protected against overload. A maximum stroke of 6 in. is provided in the cylinder; traverse table has a maximum span of 30 in.

Die Casting Machine

A new die casting machine for the production of small zinc, tin and lead alloys has been introduced by Light Metal Machinery Inc., 607 Ariel building, Erie, Pa. Its casting cycle is completely automatic with die movement, injection and ejection all actuated by one mechanism. The four operating speeds, 266, 400, 639 and 882 shots per hour, are predetermined by size and weight of casting being made and maintained with virtually no variance in continuous, 24-hr day production. Small, light-weight dies are easily installed and removed, reducing die-change time.

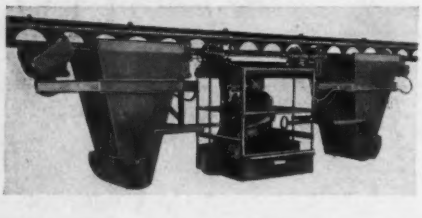
The unit operates with either air or hydraulic pressure on the injection plunger. On the standard model, plunger



diameter is 2 in., stroke is 4 in., shot capacity is 18 oz, casting area is 30 sq in. and injection pressure is 1000 psi if an air cylinder is used, or 2000 psi with a hydraulic cylinder. Other plunger sizes are available. The machine is 6 ft long, 21 in. wide, 4 ft 6 in. high, and weighs 3000 lb.

Bucket Carrier

For transportation of dry bulk materials, a new motor-driven cab operated double bucket carrier has been developed by Cleveland Tramrail Division of Cleveland Crane & Engineering Co., Wickliffe, O. Operation of carrier and opening and closing of the bucket gates are handled by cab operator who sits on swivel



chair which enables him to work in the direction of either bucket. A single variable speed drum controller is located on one side of the cab, but two foot brakes are provided, one at either end so that one is always in convenient reach of the operator regardless of which direction he is operating the carrier. Push-pull levers for opening bucket gates extend into cab and permit emptying materials in any amounts and at any rate desired.

Unit shown here has two 25 cu ft buckets and is designed for carrying a total load of 2 tons. Other sizes are available. Buckets are designed and located with reference to the tramrail arch beam rail so that they may be filled

All claims are those of the manufacturer of the equipment being described.

Rush **RECONVERSION** . . . but watch your step, too!

SIMPLIFY STOCK CONTROL WITH KARDEX

"Our Kardex Visible Stock Record has paid for itself many times over by giving us complete control over purchases, costs and turnover of thousands of items."

John H. Dolcater, Vice-President, Krauss Bros. Lumber Co., Tampa, Fla.

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Kardex "pictures" the conditions you need to know. With Graph-A-Matic signal control, stock status is charted *visibly* for decisions without computation or item-by-item analysis. You get complete and current facts instantly . . . balances, vendors, purchase history and follow-up needs . . . and according to leading users, operating costs are as much as 50 per cent *less*!

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SYSTEMS DIVISION

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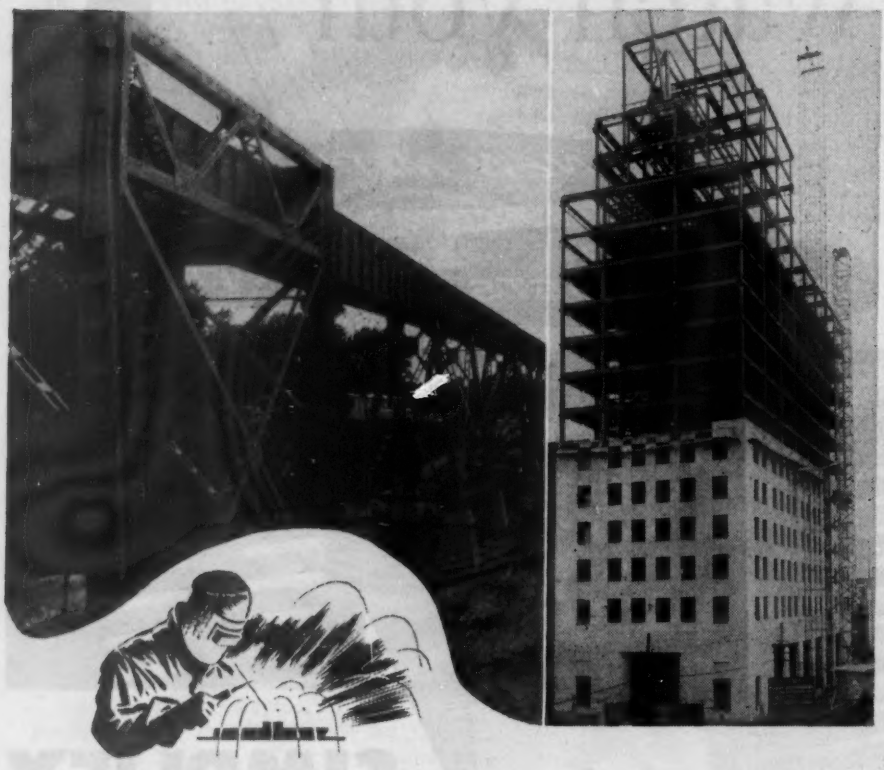
SPECIALIST

IN STEEL FABRICATION



It takes skill and experience to produce fabricated steel to fit the complex requirements of a bridge or a skyscraper. In 35 years of research and development, Ingalls has become a specialist in "tailoring" steel to exact specifications. From its three large modern plants, located at Birmingham and Pittsburgh, Ingalls has shipped thousands of tons of fabricated structural steel and plate work—cut and shaped to fit virtually every type of construction. The Steel Construction Company, an Ingalls subsidiary, is maintained to provide competent erection services when desired.

We take pride in our reputation built on ability to deliver a wide variety of steel requirements according to specifications and schedules at reasonable cost.

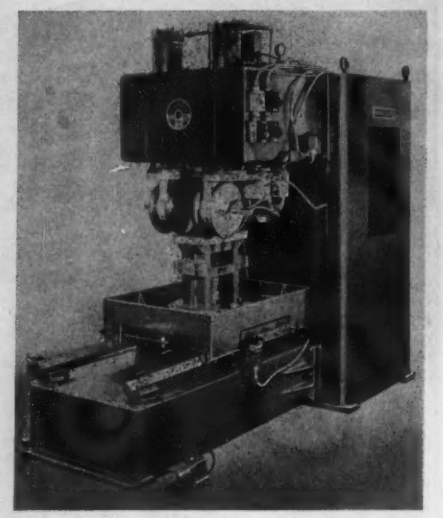
INGALLS
STEEL

THE INGALLS IRON WORKS COMPANY, THE INGALLS SHIPBUILDING CORPORATION, The Steel Construction Company, Birmingham Tank Company. Offices at BIRMINGHAM, New York, Washington, Pittsburgh, New Orleans. Fabricating plants at Birmingham and Pittsburgh. Shipyards: Pascagoula, Mississippi, Decatur, Alabama.

from overhead bins without interference or spillage. Carrier is provided with two motorized travel drives, one at each end, and operates at speeds up to 600 fpm.

Seam Welders

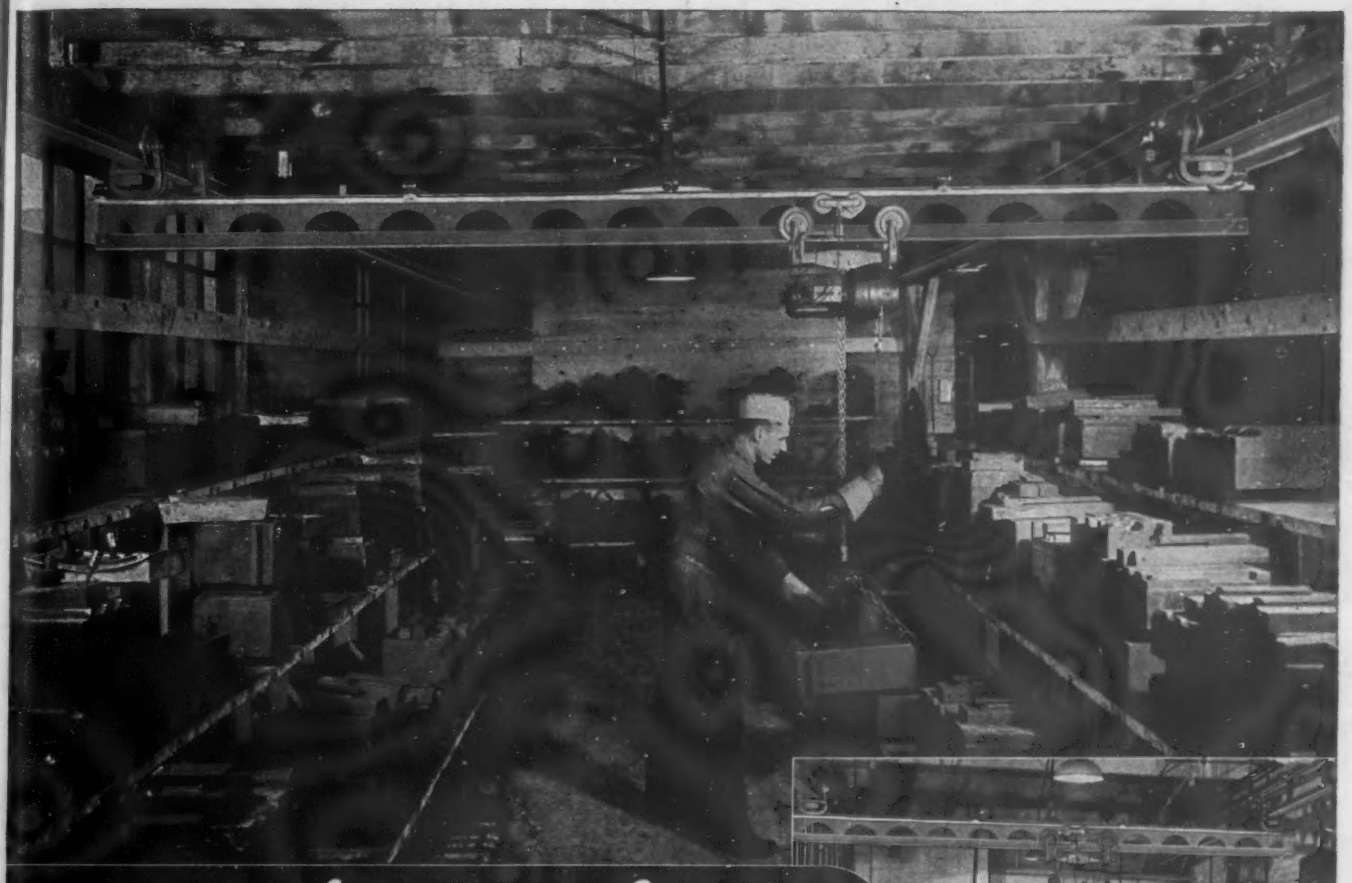
Duplex seam welders, designed for simultaneous seam welding of two or more parallel seams on one surface are announced by Progressive Welder Co., 3050 East Outer drive, Detroit 12. The machines are available in a wide range of capacities and sizes, are air operated and fully automatic. A duplex head on the machine accommodates either two or four welding wheels. On the model shown in the accompanying photograph, two seam welding wheels are provided on each of the two welding heads. Outer wheels are of larger diameter to provide clearance for four inner wheels while outside wheels are used for welding. All wheels are free rotating. They are driven by contact with moving work under welding pressure.



Work itself is carried on a work table mounted on horizontal slide rails. Top of work holding fixture is formed by a flat copper plate which provides lower path for welding current between welding wheels, thus platen top becomes lower electrode for both wheels. Welding wheels, lower electrode, welding transformer, etc., are all water cooled. A deep coolant trough is integral with moving work table.

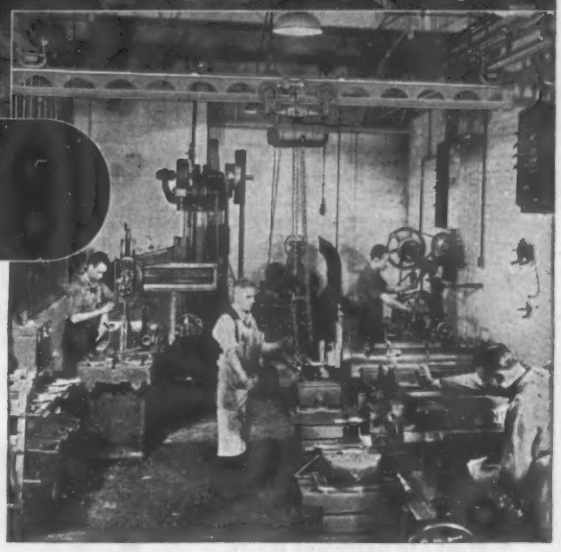
Entire assembly moves in and out of machine as welding operation proceeds. Operation of movable table is by air cylinder connected with hydraulic cylinders acting as dash pots to insure uniformly smooth table travel. Speed of work table has a wide stepless adjustment range from 0 to 30 ipm at usual factory air line pressures. Limit switches engage dogs on the work table to automatically control table travel, fixture indexing and start of welding cycle on both "in" and "out" strokes.

The units are available with transformer capacities up to 500 kva; a wide range of work table sizes and travels; and many combinations of welding



. . . *Inexpensive Cranes*

SAVE VALUABLE TIME!



ELECTRIC HOISTS *do the* HEAVY WORK

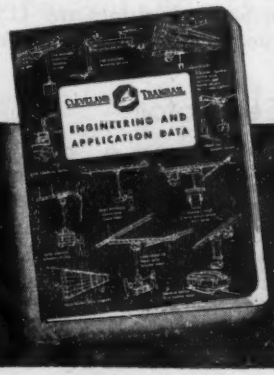
Easy rolling hand-propelled cranes with electric hoists can save time of skilled workers and promote efficiency in dozens of places. Such cranes often pay for themselves within a few months.

The Fairmount Tool & Forging Co., Cleveland, make good use of these cranes. One in the tool and die department cuts lost production time for both skilled workers and machines. This means greater output and lower costs.

Another crane in the die storage department makes possible an efficient die-storage scheme that should prove advantageous to many others. The die storage room has been provided with shelves on which the dies are stored in step fashion in numbered positions. Thus any die can be picked up or set in place without disturbing other dies. Locations of dies are quickly found by means of an index.

Above: Heavy dies are easily handled in this efficient die storage room. The electric hoist does the hard lifting. A gentle push moves the crane to any point on the runway.

Below: These valuable men spend less time handling materials and more time with actual production because of the help of this inexpensive Cleveland Tramrail crane.



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THE CLEVELAND CRANE & ENGINEERING CO.
1125 EAST 283RD ST. WICKLIFFE, OHIO.

CLEVELAND TRAMRAIL

OVERHEAD MATERIALS HANDLING EQUIPMENT

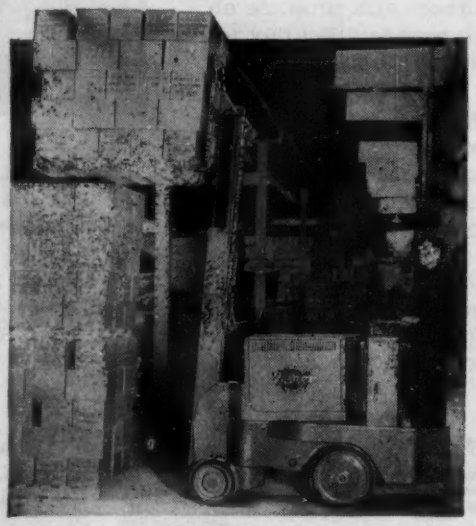
New Baker ARTICULATED Fork Truck cuts aisle requirements

DESIGNED PRIMARILY FOR EFFICIENT WAREHOUSE OPERATION

A basically new design* involving a new method of steering by "articulating" the frame, permits swinging the load to line it up in position without lining up the truck itself. Thus this truck requires about two feet less space for placing loads at right angles to aisles. It needs less clearance on turns, and speeds carloading or any other handling operation where loads must be lined up or positioned in congested areas.

Specific advantages of this truck are:

1. Works in narrower aisles.
2. Turns in a smaller radius.
3. Spots loads quicker and easier.
4. Control units are more accessible.
5. Simpler Steering design cuts maintenance.
6. Permits mechanization of handling where hand trucks were necessary because of space limitations.



Field tests in both warehouse and production operation have proved the many advantages of this new truck. For complete specifications request Bulletin 1330.

*Licensed under Stevenson Patent No. 2,284,237.

BAKER INDUSTRIAL TRUCK DIVISION *of The Baker-Raulang Company*
2167 West 25th Street • Cleveland, Ohio
In Canada: Railway and Power Engineering Corporation, Ltd.

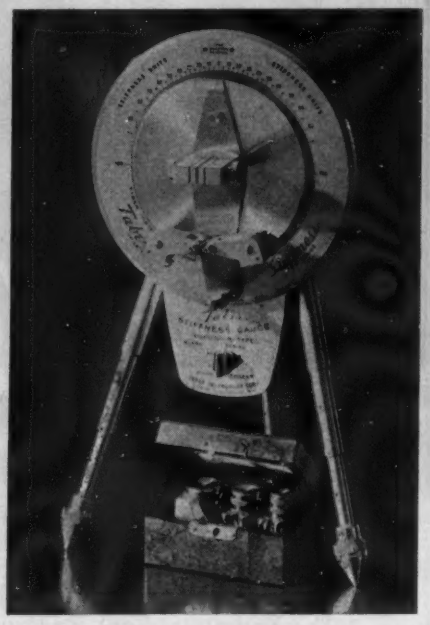
Baker INDUSTRIAL TRUCKS

wheel diameters and spacings. Conventional timing and sequence controls are used. Stroke of the head is adjustable.

Stiffness Gage

For determining standard measurements of the stiffness and resilient qualities of flexible materials up to ⅛-in. in thickness, such as laminated plastic, cardboard, light metallic sheet and wire, a new V-5 power driven stiffness gage is announced by Taber Instrument Corp., 111 Goundry street, North Tonawanda, N. Y. Without the addition of attachment, the instrument will measure both initial and normal stiffness characteristics, also elastic or "creep" of specimen structure can be charted from various readings.

Calibrated weighing system is of pendulum type. Entire pendulum assembly



with the exception of the calibration weight is made of strong aluminum alloy, keeping inertia and bearing friction to a minimum. Face of specimen clamp is mounted exactly on center of rotation insuring constant test length of specimen. A set of calibrated weights are provided with the instrument consisting one each calibrated in 500, 1000 and 2000 stiffness units. Weights of 3000 and 5000 units are also available.

Instrument is portable, weighs 15 lb and can be plugged into any 115 v, 60 cycle circuit in the laboratory or plant.

Die Separator

Lyon-Raymond Corp., 2327 Madison street, Greene, N. Y., announces a new die separator as an optional feature for their portable hydraulic elevating table. It consists of a tubular superstructure which fastens to the base of the table by four bolts with wing nuts. Dies are separated by elevating table top, fastening top section of die to superstructure

No. 12 of a Series: "Looking at the FIVE ESSENTIAL THINGS you never see in ELECTRODES!"

Extruding an electric-furnace electrode. Sixty years of experience, guided by continuing research, enables National Carbon Company to make electrodes of unmatched quality.
MATCHING STRIDES WITH STEELMAKERS

Under the stimulus of war, the steel industry has developed new techniques to attain new highs in efficiency. The industry is thus better equipped to meet the challenge of the days to come.

Matching strides with the steelmakers, National Carbon Company, Inc. . . . through continuing research . . . also successfully rose to meet this war crisis. Carbon and graphite electrodes performed as never before.

And now in the days to come, continuing research—one of the "five essential things you never see" in electrode-manufacture*—will continue to help us to parallel the progress of steel by turning out ever stronger, more uniform electrodes.

• • •

*These "five essential things you never see" in electrodes are: selection of raw materials, manufacturing experience, manufacturing control, continuing research, and customer service. They are a part of every "National" and "Acheson" electrode. We shall be glad to explain in detail how they can be of distinct advantage to you.

NATIONAL CARBON — ACHESON GRAPHITE

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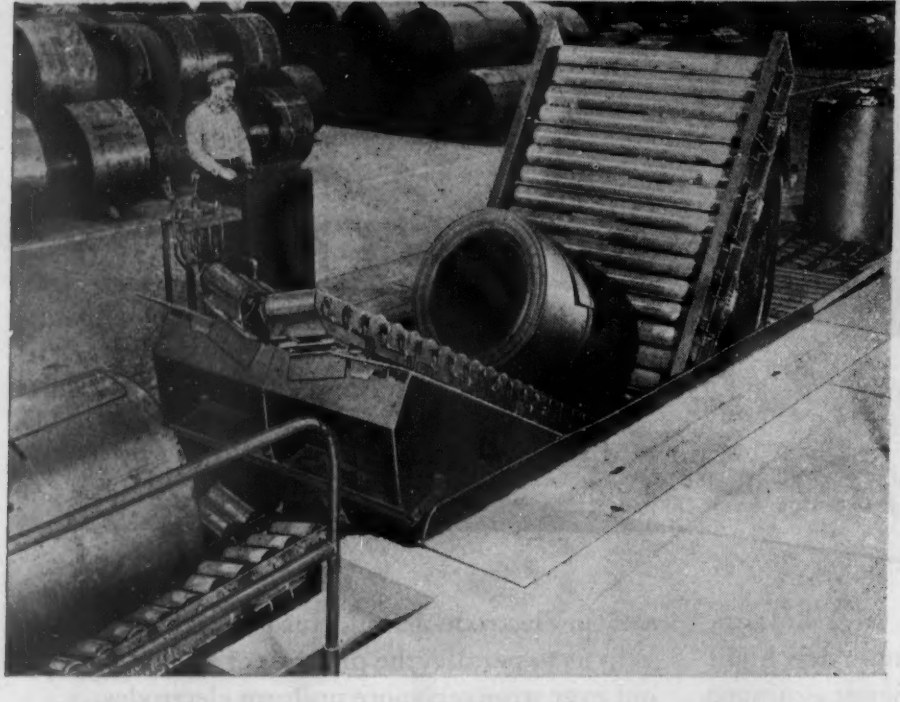
Mathews

COIL HANDLING CONVEYERS

Engineered to serve Production

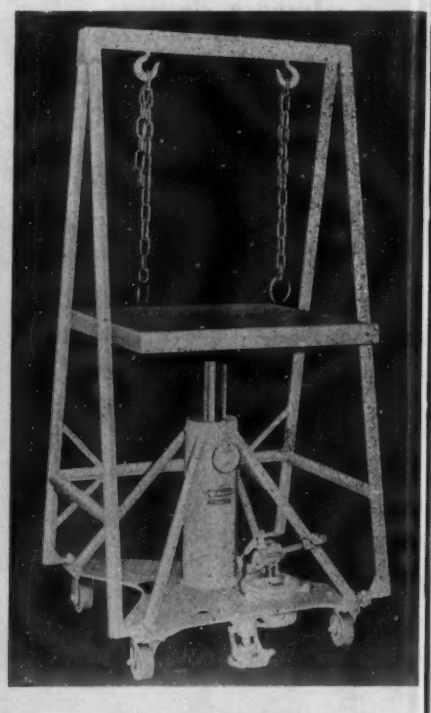


Mathews Engineers have accumulated many years of experience in the development of coil-handling conveyers. This concentrated effort has resulted in high-quality up-enders and down-enders, combination up-enders and side tilters, troughed roller conveyer, turntables, and tail pullers. There is a Mathews Engineer operating in your vicinity. He will be glad to show you what has been done in the handling of steel, brass, and aluminum coils. He will also give you data concerning the many other types of Mathews Conveyers which have been engineered to serve production.

MATHEWS CONVEYER COMPANY
ELLWOOD CITY, PENNSYLVANIA
SAN FRANCISCO, CAL. • PORT HOPE, ONT.
ENGINEERING OFFICES IN PRINCIPAL CITIES

by chains, then lowering table top with bottom section of die.

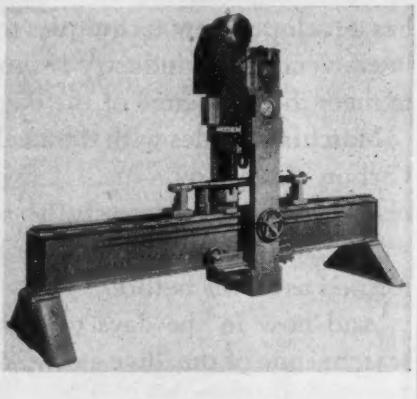
Being demountable, the die separator does not limit use of table which may be made available for such work as transferring of dies in and out of presses, sup-



port of overhanging materials, an adjustable height assembly bench and the other handling and work positioning tasks for which it was designed.

Hydraulic Press

To facilitate the loading of heavy work in straightening presses, Anderson Bros. Mfg. Co., 1907 Kishwaukee street, Rockford, Ill., has developed a new power hydraulic press. With the traveling ram



at one end of the press, crane can lower heavy work into place on the machine and then ram can be placed over work wherever required. Ram rolls on four ball bearing equipped wheels. Table is equipped with V-slide on which are mounted spring loaded centers and checking rolls.

Indicator tells the operator the amount of runout; where to stop and do straightening; during the pressure operation, it tells how much operator

Three new members of the RACO family . . .

RACO 8010 • RACO 9010 • RACO 10010

These are heavily coated all-position, reverse polarity electrodes for welding special high-tensile low alloy steels. Though new on the market their high quality is assured through our searching laboratory tests, and demonstrated on hundreds of practical jobs in shop and factory. When critical metals may be had for civilian goods, these electrodes will measurably assist you to meet post-war competition.

We will be glad to send you samples of RACO 8010, 9010 and 10010. Just write—

These electrodes comply with A.W.S. A.S.T.M. Specifications A233-45T, E8010, E9010, E10010.

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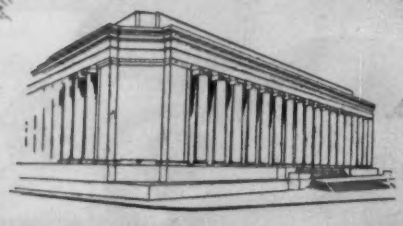

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SILVER ALLOY BRAZING FLUX

brings you these practical advantages-

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Your brazing work goes faster with SCAIFLUX because this advanced product is effective over a wide temperature range, is readily applied and the residue is easily removed.

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SCAIFLUX becomes an adhesive liquid when preheated to 160°F, is active at temperatures from 900°F to 1650° F. This simplifies your brazing procedure.

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SCAIFE COMPANY

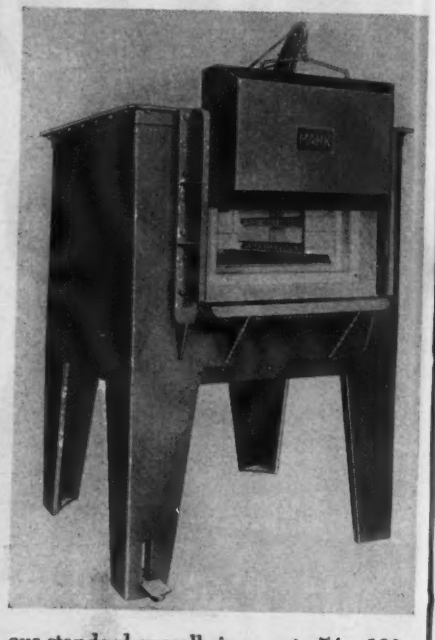
OAKMONT, (Allegheny County) PA.

is bending shaft; and as soon as pressure is released it tells what happened on first straightening "try" and gives a guide for next operation.

Hydraulic unit is manufactured by John S. Barnes Corp. of Rockford, Ill and was designed for this straightening press.

Electric Heat Treater

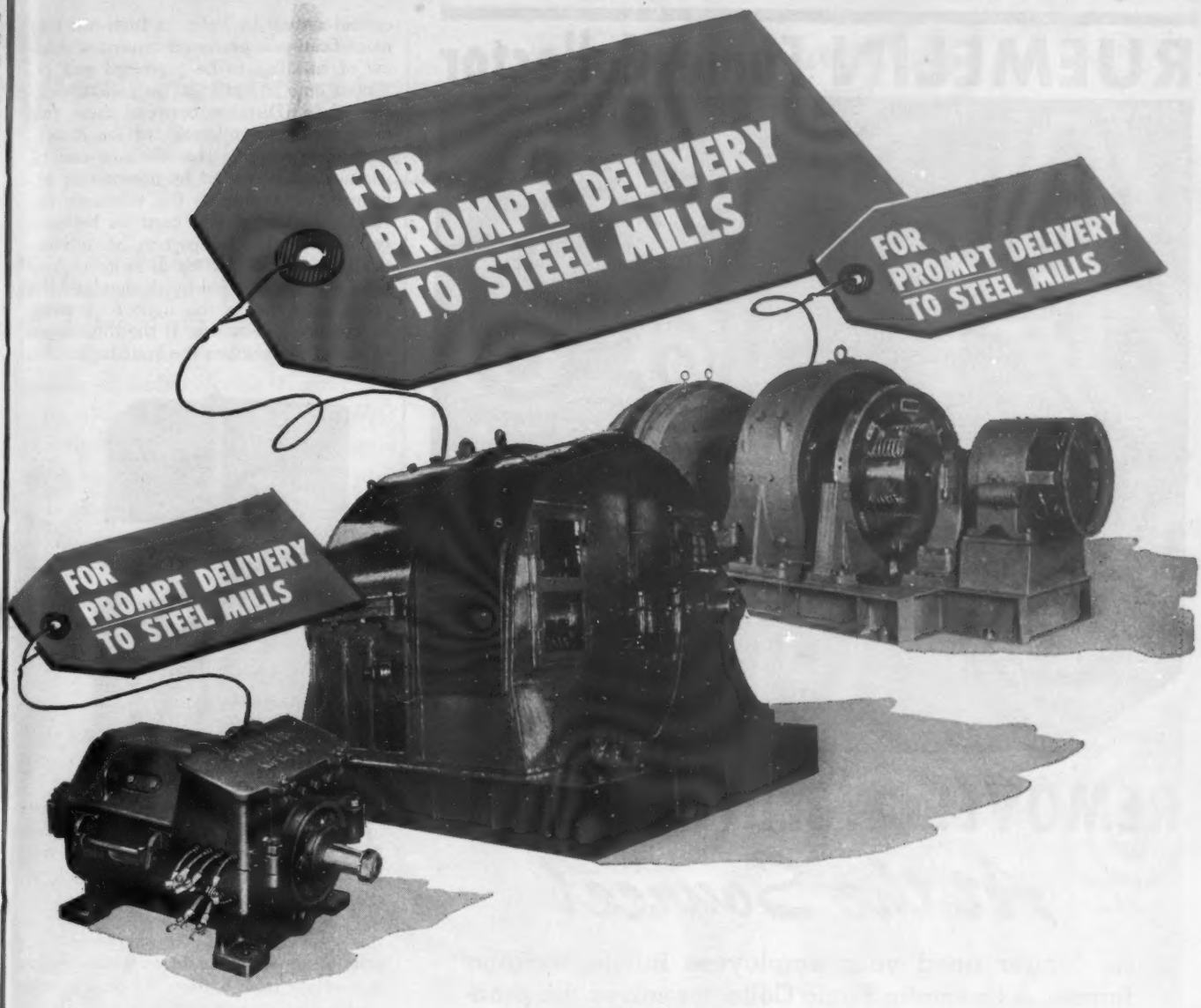
Mahr Mfg. Co., division of Diamond Iron Works Inc., 1702 North Second street, Minneapolis 11, announces a new box type electric heat treater for heat treating processes to 2000°F. Built in various standard overall sizes up to 54 x 102 x 88 in., the unit will harden carbon and alloy steels to 1850°F, temper heat treated parts, anneal, normalize or preheat high speed steels. It is also recommended as a furnace for experimental and development work and is available with or without protective atmosphere.



Inspection Machine

A new automatic electronic gaging instrument has been developed by Autotron Co., P. O. Box 722, Danville, Ill. Originally developed to gage the length of the firing pins in ordnance fuses, this unit is capable of automatically gaging a wide variety of small parts either metal, plastic, ceramic, glass or paper. Entirely automatic, the machine can gage the depth of holes, external lengths and outside diameters to very close tolerances with high precision. It operates at a speed upwards of 3300 pieces per hour. Speed of machine depends upon size, shape and manner in which part to be gaged may be handled. When possible, the machine can be hopper fed into a leading chute from which point the machine automatically feeds the pieces into inspection position.

Mechanical contact is made at a desired point in the work by a stylus rod to which is attached a razor-like flag. Image of this flag is projected into an



With reconversion completed, the Crocker-Wheeler shops are today in a better position to produce electrical equipment for the steel industry than at any time during the last five years. In fact, where we are able to obtain prompt shipment of the materials used in our equipment, we can promise "better-than-prewar" deliveries on:

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3. **Motor-generator sets to supply power for main motors, auxiliaries, cranes and hoists**

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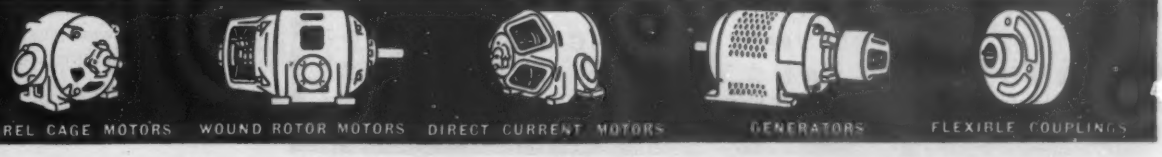

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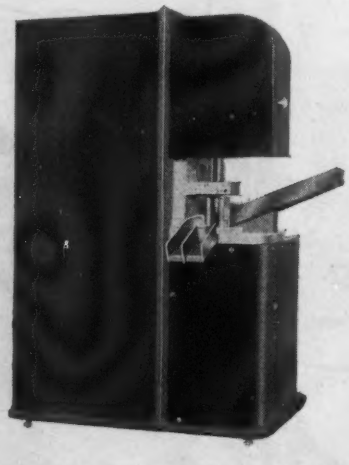
optical system by light. A high order of magnification is produced causing a shadow of this flag to be projected and reflected onto a panel of two photo electric tubes. Distance between these two tubes represents tolerance of the dimension being gaged. This distance can be widened or narrowed by micrometer adjustment according to the tolerance desired. Shadow of flag must lie between two photo tubes for part to be automatically accepted. Acting as switches, one tube must be covered by shadow and the other must be in the light to activate acceptance mechanism. If the dimensions of the piece is above the limit both tubes

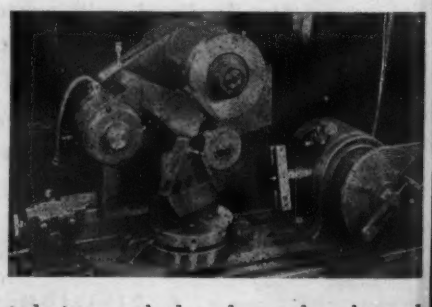


will be shadowed also causing the piece to be rejected. According to the makers it is possible to gage dimensions with tolerances as small as 0.0001-in. with accuracy.

It is possible to gage the depths of holes using either end of pieces as a reference point; shoulders within holes; projections from bottom of holes; outside length of pieces or outside diameters.

Angle Dresser

A Dunmore grinding attachment mounted on a Brown & Sharpe grinder is introduced by Zagar Tool Inc., 23880 Lakeland boulevard, Cleveland 17. The diamond is moved by hand across the face of the wheel to dress the wheel. Angle is obtained through the company's



indexing method and can be changed for any angle required. The angle dresser can be mounted in a centerline relation to the work; need not be removed for each dressing of the wheel. By using an index plate any angle can be duplicated on the dresser in minimum amount of time.

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Electrostatic Spraying

(*Continued from Page* 120)

is, as yet, an unknown factor; on installations of industrial size, that is, for spraying table tops, stove parts, etc., it will probably be necessary to use more than a single power pack; a slight increase in amperage is also necessary to overcome the additional resistance provided by a larger electrode system.

On the basis of these conclusions, a program of research was laid out to determine the effect of variations in the physical properties of enamel slips on the ability of these slips to atomize, to react to the electrostatic field, and to produce a sprayed finish that is satisfactory.

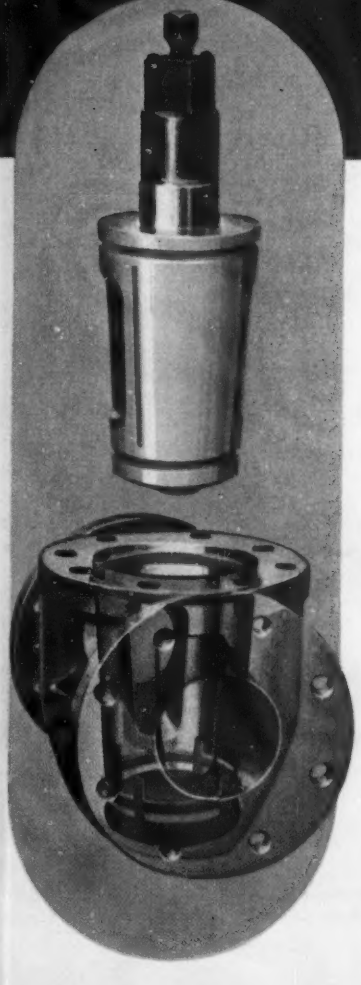
Atomization: For the purpose of identification, the atomization samples were divided into four groups. Four such atomization samples illustrate the method of classification. Fig. 4 shows a poor degree of atomization approaching the type of spray created by an ordinary enamel gun; the combination of very coarse and medium-sized particles was marked. Fig. 5 still slightly underatomized, reveals the preponderance of large splotches has disappeared.

Fig. 6 shows the most satisfactory degree of atomization, all factors considered, for electrostatic spraying of porcelain enamels. Fig. 7 is an example of overatomization; particles are so fine that many of them are carried away in the air stream. A comparison of the atomization samples shows that the quality of the finished sprayed results may be anticipated with a fair degree of accuracy.

The difference in particle size in such sprays is shown in Figs. 4 through 7. In Fig. 4, the atomization is quite coarse and decidedly non-uniform in character; Fig. 5 shows considerable improvement although it still leaves much to be desired in uniformity and reduction in particle size. The first two are likely to produce a sprayed surface too wet for practical purposes. Fig. 6 illustrates the most satisfactory degree of atomization. Fig. 7 indicates a spray so fine that, although a maximum degree of uniformity has been obtained, the surface produced would be dry and granular, and the amount of enamel lost in overspray would be excessive.

Location of Spray Gun: The most satisfactory results in sprayed finish and the most efficient use of material are obtained when an angle of 15 degrees with the surface being coated is maintained. The atomized particles leaving the gun will vary somewhat in size and therefore in inertia. In passing through the field, those particles of greater mass will react more slowly to the force of the field and will require a greater distance for this force to overcome the inertia of the particles and direct them to the surface to be coated. If the angle is increased, there is a tendency to reduce the uniformity of the deposit through localization of the force of the spray from the gun. At increased angles, there is an increased tendency to de-

THE GIANT EYE OF PALOMAR



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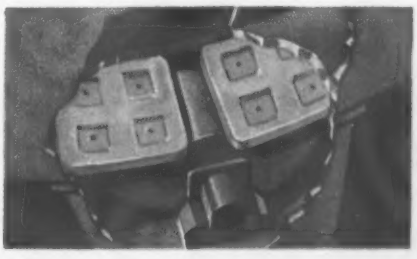

Here in giant amplification is demonstrated the principle of the Nordstrom Lubricated Valve. The plug of this valve actually floats on a film of pressure lubricant that forms the seat of the plug. *It's easy to turn.*

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velop orange peel; and, at increased angles of spray, there is also a tendency, however slight, for the smaller atomized particles to be carried away from the surface of the ware by the force of the deflected air stream. Each dissimilar object that must be sprayed will require a variation in the location and number of spray guns for maximum coverage in order that those surfaces which cannot be completely covered by the force of the electrostatic field may be covered by mechanical force of the spray itself.

Measurement of Flow Time: To simplify the investigation as much as possible, all pressures were read at the source and no consideration was given to pressure drops due to friction in the air and fluid lines. Curves were plotted from data showing constant-pressure lines when the flow time in seconds was plotted against the fluid delivery in cubic centimeters per second. Fig. 8 shows the type of curves arrived at by this method. By referring to these curves, the pressure required to give any desired fluid delivery at any given flow time may be predetermined; conversely, the fluid delivery for any given combination of pressure and flow time may be determined.

Effect of Clay Content: A comparison of the atomization photographs indicate that beyond any doubt the degree and uniformity of atomization increases with a decrease in clay content. Although neither sample 4 nor 5 contained any clay whatever, No. 4 had practically no set, while No. 5 had excellent set. A comparison of the atomization photographs between these two indicated little or no difference. Sample plates sprayed with slips of varying clay content indicate that a slightly finer sprayed texture is obtained with the sample of higher clay content.

Effects of Specific Gravity of Water Content: Plates, in general, could not be sprayed successfully by this method below a 1.60 specific gravity. The enamel was deposited in too wet a state, causing a considerable amount to flow from the sheet. At specific gravities of 1.50 and 1.55, almost all sprayed samples sagged. Where the remainder of any single series obviously would not have produced satisfactory results, no effort was made to complete the series.

There was, at all specific gravities, a large amount of orange peel when the proportion of fluid delivered to the amount of atomizing air was high. This orange-peeling tendency decreased with increased atomization. Increases in atomizing pressure gave drier surfaces, better coverage, and generally improved the appearance of the sprayed plate.

Results improved with increase in specific gravity, and the best sprayed plates were obtained at a specific gravity of 1.695.

To determine the quality of sprayed plates at actual fluid delivery rather than at pressures, the fluid pressure at which each plate was sprayed was converted to volume of fluid delivered. Regardless of specific gravity, the best results were invariably obtained when the fluid de-

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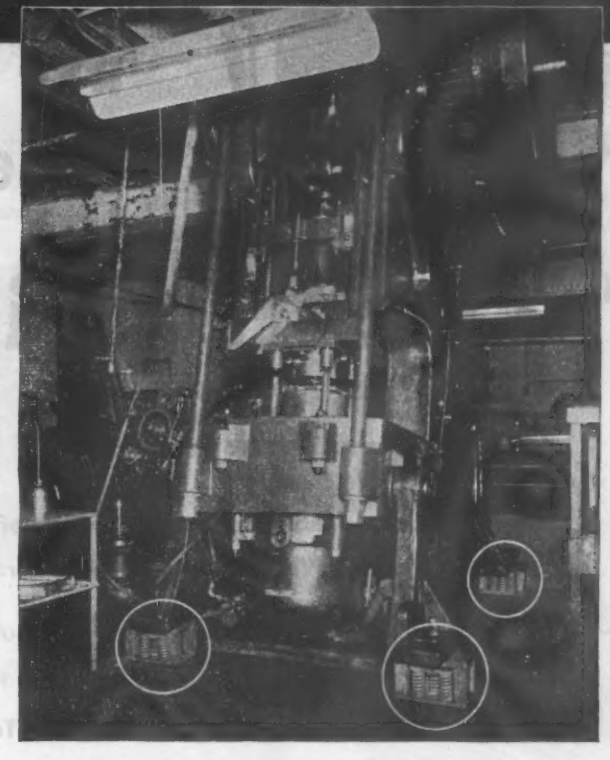

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livery was approximately 2 cc per second, together with the necessary atomizing pressure to provide a satisfactory degree of atomization. Further comparison of the results established a minimum fluid delivery of 1.5 cc per second and a maximum delivery of 2.5 cc per second for acceptable results.

The atomizing pressure was read at the source. When a pressure gage was inserted in the atomizing line just ahead of the spray gun, the true atomizing pressure at the gun was found to be approximately 5 lb less than that indicated at the source.

Atomizing pressures above 25 lb increased the velocity of the spray to such an extent that the amount of overspray appeared to be excessive.

Effect of Set: The most satisfactory degree of atomization coincides generally with the most satisfactory sprayed results. Based on this observation, it may be concluded that the degree of atomization attained may serve as a satisfactory guide to the quality of the ware sprayed by this process. The results obtained on the effect of set are shown in Table I. The weight of enamel is seen to increase slightly as the set increases. The degree of atomization was not affected by changes in set. A high set generally gave the best sprayed results. Samples Nos. 86 and 87 could not be sprayed satisfactorily because the set of the enamel was destroyed to the point where the enamel would run off the ware as rapidly as it was deposited thereon.

Effect of Fineness: The data obtained in this phase of the investigation are shown in Table II. The fourth column gives a comparison of the dry weight of the enamel deposited on each plate for each fineness, based on the total volume of the enamel sprayed from each sample. The application weight on a percentage basis actually decreases slightly down through 2 per cent on 200-mesh. The percentage application weight for the sample 2 per cent on 325-mesh is the highest in the series.

The results indicate that enamel milled through a fineness above 5 per cent on 200-mesh produces a granular sprayed surface which will not smooth out entirely on firing. With the more coarsely milled enamels, there was a slight reduction in the gloss of the fired enamel.

As indicated in Table II, there was no difference in atomization on any of the samples from 15 per cent on 200-mesh to 2 per cent on 200-mesh. The enamel ground to 2 per cent on 325-mesh appears to be slightly less uniform in atomization than the remainder of the samples.

Overspray: From the data obtained in determining what savings might be expected in the way of reduced overspray, a figure of 28.9 per cent was obtained. Owing to the length of the field and the size of the sample plates used, this figure is somewhat higher than would normally be found in an industrial application. The amount of overspray probably would be reduced to as little as 15 to 20 per cent.

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was offered from time to time to spray a variety of shapes. These included broiler doors, refrigerator inner doors, oven liners, architectural panels, and finally a section of a lavatory. The size and shape of the majority of these pieces necessitated the use of multiple guns. A considerable amount of adjusting of the location and number of guns for each individual shape was necessary. Those pieces with flat surfaces and no protruding or recessed sections, and with simple flanges, were sprayed quite readily. Some difficulty, however, was encountered, when using two or more guns spraying parallel to one another in adjusting the position of the guns and the pattern of the sprays so as to prevent either an over-lapping of the sprays causing an excessively heavy deposit in one area, or a division of the sprays causing a slightly lighter deposit in one area.

The variations in thickness of application cannot be compared in any way with those found in spraying paints and lacquers, because such minor variations as would cause rejection of ware finished in porcelain enamel would scarcely be noticed in lacquer finishes owing to their greater opacity or covering power.

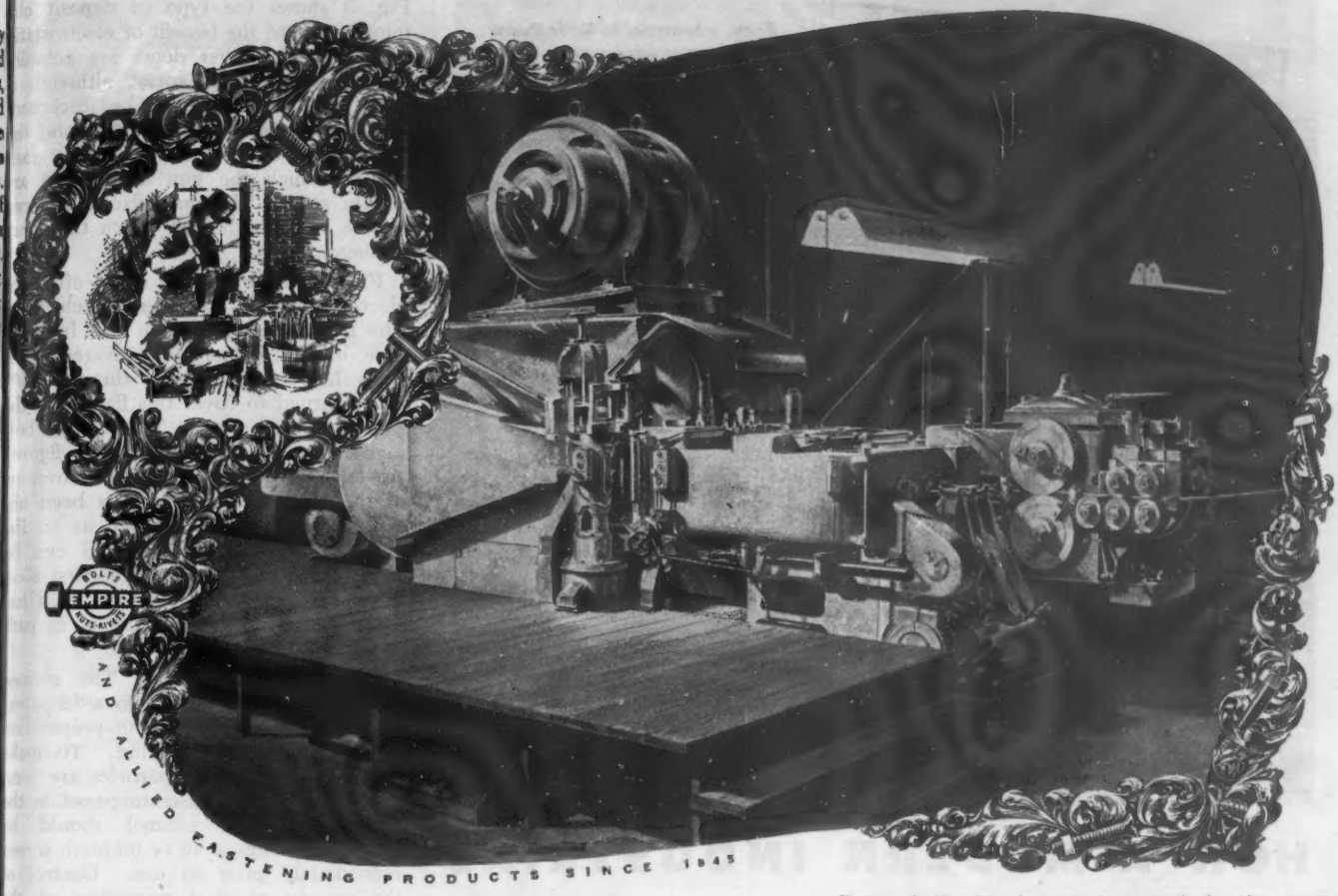
Two of the sprayed shapes were formed in such a way that the surfaces were either embossed or corrugated; it was impossible by any manipulation of the location of the guns to fill in and around the radii of the recesses of these samples.

The lavatory section was found practically impossible to coat uniformly either by means of the electrostatic field or by the mechanical force of the spray, regardless of the location or number of guns within the limits of the equipment used.

These difficulties which were encountered in spraying the various shapes represent limitations on the use of the equipment. Perhaps they might be more properly referred to as obstacles which must be overcome before maximum advantage may be taken of the process. It is evident that, as in electroplating, protruding edges and recessed sections are quite difficult to cover uniformly. This may be rectified in the design of the electrode system to compensate for the difference in distance between the electrode and the grounded object or in the location and number of guns used.

Cylindrical or similarly symmetrical shapes may be sprayed quite readily by causing them to pass through the electrostatic field while rotating on their axes of symmetry. Such shapes as thermos bottles, powder cases, and the like have been sprayed with paints and lacquers by this method with a great deal of success both as to uniformity and savings of materials.

The spraying process and the effect of the electrostatic field are illustrated quite clearly in Figs. 9 and 10. The 10 x 18-in. broiler doors are being sprayed with a single gun at a conveyor speed of 2½ fpm. The process, of course, could be adjusted to any desired speed by the use of additional guns.



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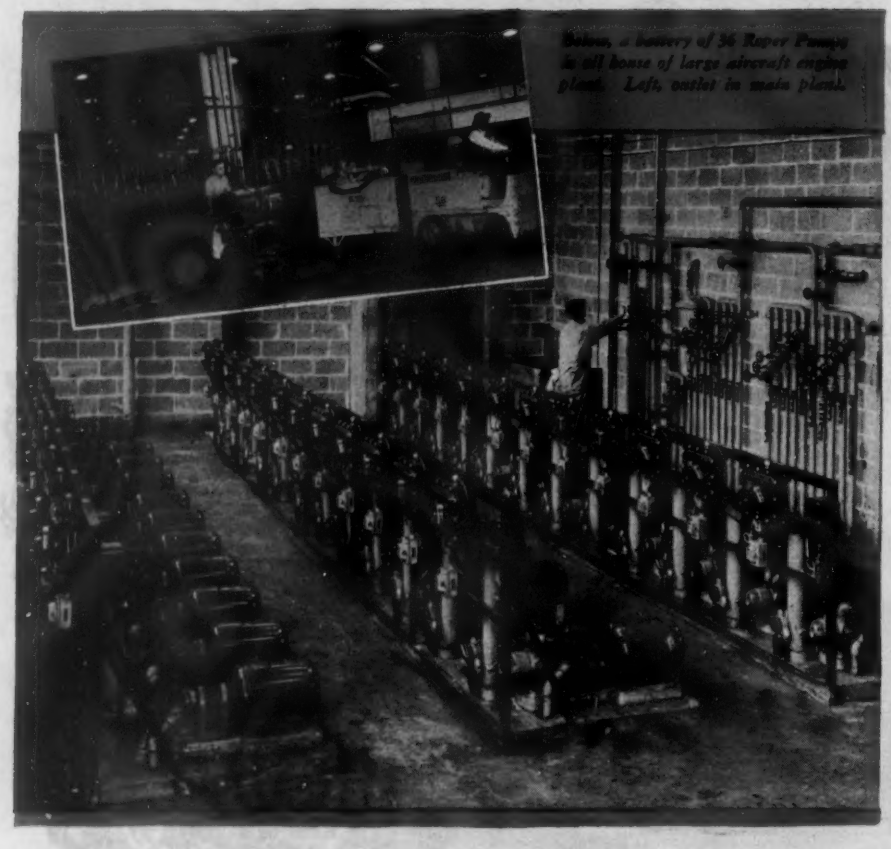
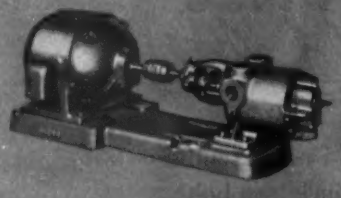


Below, a battery of 36 Roper Pumps in oil house of large aircraft engine plant. Left, outlet in main plant.

HOW A MODERN INDUSTRIAL PLANT SAVES TIME AND LABOR *with* ROPER PUMPS



JOB FACTS

Thirty-six Roper Fig. 26-F-20 rotary pumps, each individually powered by a 3 H.P. motor, are used in the oil house. Automatic pressure switches maintain a pressure of 40 lbs. in the lines. These pumps have a rated capacity of 20 g.p.m. Each Roper Pump is equipped with deep packing box, equal sized spiral gears, a flexible slider coupling drive, and flanged bronze bearings which support gears at both ends. Internal parts can be inspected or replaced quickly and easily without disturbing piping or mountings.

The big bank of Roper Pumps, shown above, are located in the oil house to speed handling of cutting oils, solvents, coolants, hydraulic and hot engine oils, and other liquids. From storage tanks direct to outlet stations, through overhead and underground pipes, they quickly dispatch the various liquids to test rooms and machining and assembly floors where convenient filling station outlets are situated. The nearest station is 1500 feet and the farthest is 5500 feet from the oil house. *Thus Roper Pumps help to save time and manpower* by eliminating inter-plant delays and inconveniences that would otherwise be associated with transporting large volumes of oils, solvents, etc.

SEND FOR BOOKLET

"How to Solve Pumping Problems" No. 11-48. It's a valuable guide for those interested in the operation, maintenance, or selection of pumps.

GEO. D. ROPER CORP., ROCKFORD, ILL.

PUMPS ESPECIALLY ENGINEERED TO FIT YOUR REQUIREMENTS

ROPER *Rotary Pumps*

BUILDERS OF PUMPS FOR MANUFACTURING, MARINE, PETROLEUM, AND PROCESS INDUSTRIES

Fig. 9 shows the type of deposit obtained without the benefit of electrostatic field. These broiler doors are actually passing through the spray, although it is so fine that it cannot be discerned. The leading flange on the doors and the light deposit of enamel on the face toward which the gun is directed are clearly seen. The only flange covered by the spray is that on which the spray impinges.

Fig. 10 illustrates the effect after the electrostatic field has been switched on. The leading flange, which was formerly bare, has been completely covered. The spray has actually turned through 180° and returned to cover this flange on the side opposite the gun. The top and bottom flanges (not shown in the figure) are also covered. Complete coverage of the broiler doors has thus been obtained on all flanges as well as on the face. The effect of the field can be seen plainly just opposite the first electrode wire. The force of the field has caused the spray to bend out of its path as quickly as it enters.

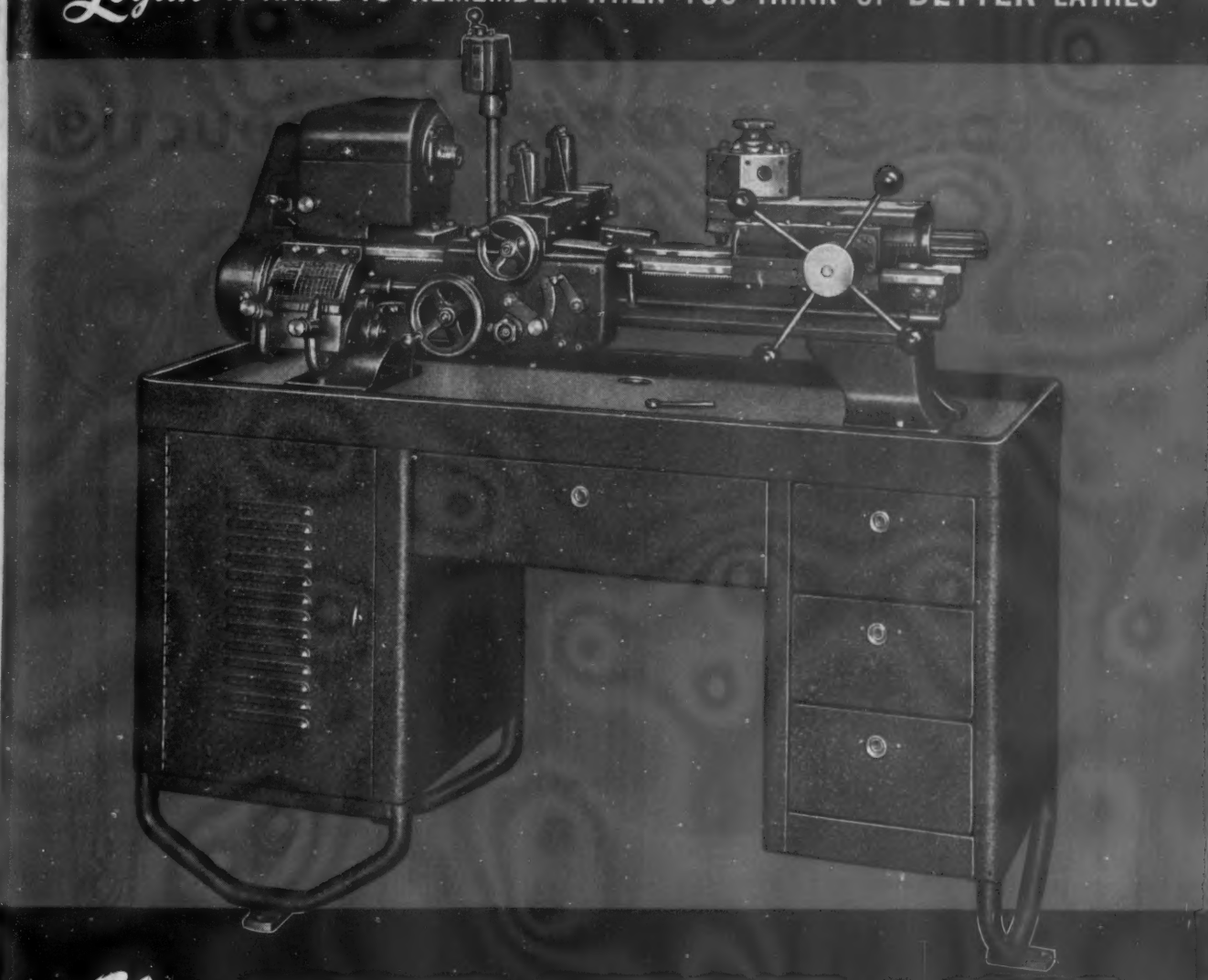
Discussion of Results: The success of the operation depends to a large extent on proper care in the preparation of the enamel for spraying. To make certain that no coarse particles are present which might cause stoppages in the spray guns, the enamel should be screened through a 40 or 60-mesh screen immediately prior to use. Control of the various physical properties of the enamel slip, such as fineness, specific gravity, and set, assumes an even greater degree of importance with this spraying operation than it does in the hand or mechanical-spraying operations now in existence.

In normal operations, atomizing pressures from 15 to 20 lb are sufficient to provide the degree and uniformity of atomization required. Atomizing pressures in excess of 20 lb increase the amount of over-spray to the point where it appears to be excessive. For uniform results, atomizing pressures should not be allowed to vary from a given setting by more than 1/2 lb.

Fluid pressures will vary from 6 to 13 lb, depending on the viscosity of the slip. Control of fluid pressures is one of the most critical phases of the spraying operation. Since comparatively small quantities of fluid are being delivered through each gun, any minor variation in fluid delivery through the guns will actually amount to a relatively large percentage of variation; and since the fluid pressure governs the volume of fluid being delivered, minute variations in the fluid pressure are evidenced as noticeable variations in the fluid delivery. Fluctuations in fluid delivery result in variations in the degree of atomization and so decrease the uniformity of the spray. An accurate pressure-control system, then, is an absolute necessity.

Although the investigation indicates that the clay content of the enamel slip has a decided effect on the degree of atomization obtainable, the effect is not so severe as to make the elimination of clay from the mill additions essential. As

Logan A NAME TO REMEMBER WHEN YOU THINK OF BETTER LATHES



New LOGAN TURRET LATHE

Precision Built For Sustained Accuracy, Speed, Versatility and Convenience

LIKE all Logan Turret Lathes, the new No. 845-2 turns out a volume and variety of accurate work at high speed and low cost. In addition, it is mounted on a compact, all steel, 4-drawer cabinet that provides convenient tool storage. Note the three-point base on which this cabinet stands, an exclusive Logan feature that gives firm footing on any floor.

The new No. 845-2 has all the Logan advanced design features that assure accurate work, versatility, and low cost maintenance through the years. The spindle turns on ball bearings. Self-lubricating bronze bearings are at 40 other vital points. The friction feed automatic apron travels on bed ways which are precision ground to within .0005" of parallelism. The heavy, pilot operated, hexagonal turret provides smoothness and accuracy on heavy cuts, and lengthens tool life as well. The underneath motor drive is completely enclosed in the left side of the steel cabinet. A standard Logan compound rest assembly and tailstock assembly are practical accessories to order with the lathe. They are interchangeable with the cross slide and turret, quickly converting the No. 845-2 into a screw cutting lathe.

SPECIFICATIONS COMMON TO ALL LOGAN LATHES . . . Swing over bed, 10½" . . . bed length, 43⅛" . . . size of hole through spindle, 25/32" . . . spindle nose diameter and threads, per inch, 1½"-8 . . . twelve spindle speeds, 30 to 1450 rpm . . . motor, ½ hp, 1750 rpm . . . ball bearing spindle mounting . . . drum type reversing motor switch and cord . . . precision ground ways, 2 V-ways, 2 flat ways.

N-1

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Every hoist, every trolley, every crane in the WRIGHT line has distinctive advantages for specific jobs. Some of these WRIGHT advantages are:

1. **Special analysis steel chain, electrically butt-welded, heat-treated and proof-tested. Will not work harden.**
2. **Each link is gauged to fit pocket wheel. The chain is exceptionally high in tensile strength.**
3. **Non-fouling chain guide permits pulling of hand chain from any angle below hoist.**
4. **Planetary gear reduction of efficient and compact design.**
5. **Drop-forged bottom hook from special analysis steel gives visible warning when overloaded through slowly opening without fracture, thus providing safe operation.**
6. **Precision ball bearings to increase efficiency and ease of operation.**

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a matter of fact, the presence of a small amount of clay in the milled enamel under certain conditions may have a slight tendency to improve the workability of the system and the appearance of the sprayed surface.

To summarize the results of the portion of the investigation devoted to the effect of specific gravity or water content, when the specific gravity was below 1.60 and the set generally poor, the sprayed surfaces were almost invariably too wet, the enamel running off the plate entirely in some instances while in others a severe sagging was noted. This sagging took place whenever the set was poor. The best samples were obtained at the specific gravity of 1.70.

In comparing the quality of the sprayed finish at each specific gravity with the volume of fluid being delivered to the gun at various pressure settings, the best sprayed samples were invariably obtained when the fluid delivery from the gun approximated 2 cc per second. Closer scrutiny of these results indicated that all samples were generally poor when the fluid delivery exceeded 2.5 cc per second or fell below 1.5 cc per second.

The set of the enamel appears to play a relatively small part in the ability of the enamel to react to the electrostatic field or in the degree of atomization obtainable. In view of the exaggerated tendency for the enamel to sag at the comparatively low specific gravities used, a maximum degree of set must be maintained.

Regardless of the fact that the data obtained would seem to indicate that enamel milled to a fineness above 2 per cent on 200-mesh may not be used so successfully, it is believd that enamels may be sprayed equally well when milled to a fineness as high as 5 per cent on 200-mesh. This conclusion is based on the fact that the enamels used in this phase of investigation, having been prepared in 3 lb laboratory mills, were composed of particles of frit of considerably greater average particle size than if large mills were used.

Mill additions other than clay have no apparent effect on the ability of the slip to react to the electrostatic field.

Increased viscosity of the slip, contrary to what might have been expected, does not, within working limits, affect the ability of the enamel slip to atomize.

Difficulty will undoubtedly be encountered at first in determining the proper location and adjustment of spray guns to provide the desired degree of uniformity of application. When a standard operating procedure is established, however, a minimum variation in the finished quality may be anticipated.

Conclusions: The factors which make electrostatic spraying valuable in the application of organic coatings apply equally to porcelain enamel. The process can be satisfactorily used for spraying of enamels, and when properly used, produces a uniformly coated product with a minimum of loss due to overspray.

Although the process appears to offer

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The secret is a new cement BOND . . . stronger than any yet developed! The "teeth" (the abrasive) can not come loose from the backing under the most severe use . . . result is *longer life* with greater *safety!*

Weldisks have the toughest "teeth" in commercial use today – electric furnace treated aluminum oxide, and that spells – *faster cutting!*

Weldisks have a special, 3-ply backing: 1 layer of fibre, specially treated and pressed for double strength and hardness, to keep Weldisk edges from going "flabby"; 2 layers of heavy cloth, encasing the fibre, to keep the fibre from cracking when bent!

Finally, Weldisks are cured by a new process that ends curling and warping.

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CLEANS FACTORY GLASS at 75% SAVINGS

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DALITE will remove the hard, crusted coatings and rust stains from ribbed, florentine or rippled glass, quickly, easily and cheaply. Under ordinary conditions one barrel will clean 44,000 square feet of glass and an unskilled workman can clean from 5,000 to 6,000 square feet daily.

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JUST BRUSH IT ON!
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RINSE IT OFF WITH A SPONGE OR RUBBER HOSE

10 GALLONS SHIPPED TO YOU FOR TRIAL

Because we are confident Dalite will do exactly as we have stated, we will ship a trial ten gallon keg of Dalite without obligation to you. If upon receipt and trial of Dalite you are not convinced that it is the most amazing heavy duty glass cleaner you have ever seen, just drop us a line and the charge will be cancelled.

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DALITE IS ECONOMICAL

DALITE IS A CONCENTRATE

4 parts water—1 part DALITE for heavy ribbed glass

10 parts water—1 part DALITE for plain glass

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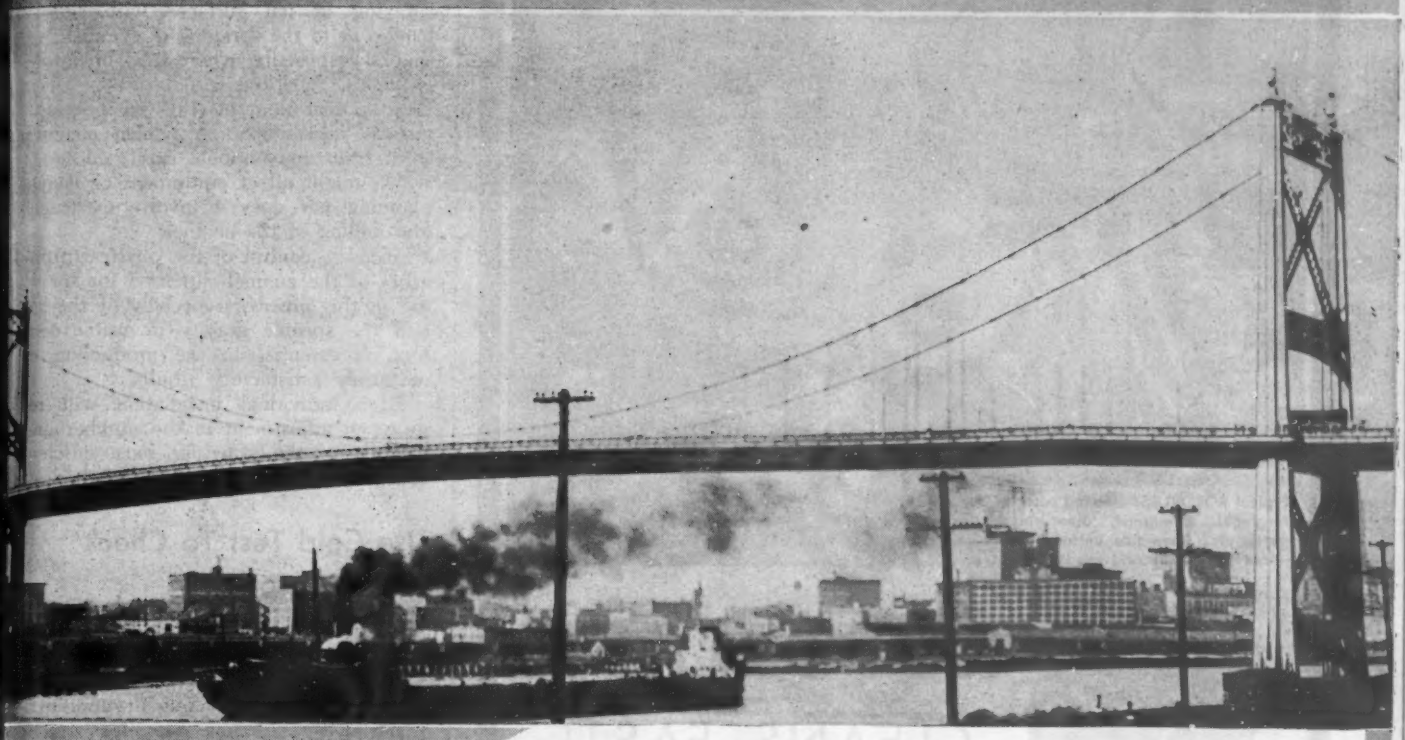
RUSTAREST

ARRESTS AND PREVENTS RUST



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This bridge was painted in 1937 and upon recent inspection RUSTAREST is still in good condition.

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Rustarest is the most modern method of protecting metal against corrosion. The use of Rustarest as a prime coat will effectively bond the protective coat and give it additional life and strength. Rustarest primer can be used in combination with aluminum to form a prime coat and also an outer protective coating.

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The LARGEST SINGLE ITEM OF EXPENSE in repainting is the preparation of the metal. Because Rustarest may be applied over rust, this expense is practically eliminated. (When paint is used, all rust must be removed or the rusting action will continue and soon break through the paint or force it off). Because Rustarest kills rust and renders the metal passive and keeps it so, there is no destructive action going on under the paint . . . no attack from the rear. Therefore, it will LAST LONGER and repaint operations will be LESS frequent.

There will be NO STRUCTURAL DETERIORATION from corrosion during Rustarest's long life.

Rustarest covers from TWO TO THREE TIMES AS MANY square feet per gallon as paint.

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Typical ROTOBLAST cleaned castings, forgings, stampings, heat-treated parts, etc., have fine uniform finish —free from scale and sand.

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CLEANS FAST!

Increased production at lower cost add up to more for your money . . . that's why Pangborn's ROTOBLAST* Airless Cleaning Equipment is found in daily service in so many modern foundries. Years of specialized experience and research by Pangborn engineers are embodied in Airless ROTOBLAST* principle to (1) lower cleaning costs (2) increase quality of cleaning (3) boost production.

Specify Pangborn ROTOBLAST* Barrels, Tables or Special Machines (depending on your requirements) for better cleaning of gray iron, malleable and steel castings, forgings and heat treated parts . . . at lower power cost. Write today—without obligation—for pertinent literature.

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an appreciable savings in material consumption, proof of this fact may be obtained only through an industrial installation of the equipment.

The process lends itself readily to the spraying of flat surfaces with simple flanges or to the spraying of symmetrical shapes, especially where the operation is highly repetitive.

In preparation of the enamel, the process necessitates no radical changes from the conventional mill additions which might affect equipment or layout planning nor does it involve extremely fine milling of the enamel.

Accurate control of the physical properties of the enamel slip used for spraying in this process, especially of the set and the specific gravity or water content, is essential to the production of uniformly satisfactory results.

Each individual installation will require an adjustment in the number and location of the guns for most efficient operation.

Use Cold Test To Check Shock Absorbers

Motor vehicle and railroad shock absorbers built in summer weather now will operate efficiently on cold winter days, even in arctic regions where temperature stays below zero for a long time. How this has been accomplished in the plant of Monroe Auto Equipment Co., Monroe, Mich., is revealed by Refrigeration Equipment Manufacturers' Association following a survey of new uses of refrigeration in peacetime.

Cold tests of recently installed equipment employ temperatures as low as minus 120°F, controlled to a fraction of a degree. By determining degree of stiffness of shock absorber fluid in various low temperature ranges and then testing on dynamometers the resistance of shock absorber valves, a medium is reached so that shock absorbers will operate equally well under all conditions. As temperature drops and fluid stiffens, action of shock absorbers is retarded unless compensated for by proper regulation of valves.

Refrigeration equipment is used for testing the two-way hydraulic shock absorbers used on passenger cars, trucks and buses, railroad freight cars and Pullmans, and hydraulic seats for trucks and tractors.

Weld Cast Iron

A new welding electrode for making machinable welds in cast iron has been produced by International Nickel Co.'s new electrode plant at Bayonne, N. J. It is a development of Inco's Research Laboratory, with the co-operation of the Bayonne Works. Designated as Ni-Rod, the electrode is a mate to another comparable electrode known as "133", an 80-20 nickel-chromimium product for welding the Inconel side of Inconel clad steel .In all, six types are in production at Bayonne.

This book brings
POWDER METALLURGY
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THESE DUREX PARTS TELL THE STORY
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By Machining Methods This Cam is a "Headache"
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Characteristics of this Durex cam are smooth surface, close tolerances and exceptional wear-resistance.
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56 Pages—Illustrations, Diagrams, Charts

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The purpose of this book is to give engineers and production men the *practical information* they need to determine where powder metallurgy fits into their production picture. It is honest, realistic, down-to-earth . . . takes you from the methods of producing powder metal parts right "down to cases" on design, physical properties and application data. Send for it today, and take advantage of the savings in man-hours, machining time and money that powder metallurgy has to offer *when properly applied.*

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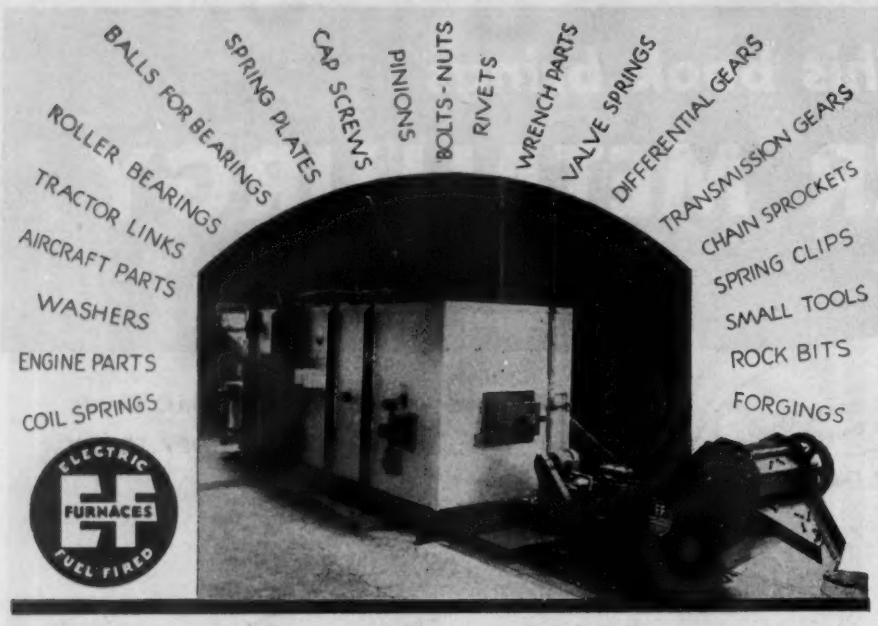


For Hardening Small Parts

Uniformly—Scale-Free—Continuously

Charging end of EF chain belt furnace showing cap screws loaded directly on conveyor—no pans or trays are used—100% net material

This EF gas fired radiant tube furnace is one of 3 chain belt furnaces we installed in one plant. The furnace shown at top of page is electrically heated

Products being treated in EF Chain Belt Furnaces, include:

Sprockets
Cap screws
Bolts and nuts
Gears and pinions
Flat springs
Coil springs
Small forgings
Valve springs
Spring plates
Tractor links
Rivets and washers
Wrench & tool parts
Bearing parts
—cups and cones
Machine gun
cartridge clips
Aircraft engine parts
Automotive parts
Rock bits, and many
other products

175 to 2000 lbs. per hour

The EF chain belt conveyor furnace is one of the most satisfactory and dependable general purpose heat treating machines built for the continuous, uniform, economical, production heat treatment of miscellaneous small and medium sized parts and products.

These furnaces handle all kinds of parts and products ranging in size from small bolts and springs up to large crawler links for tractors. Hundreds are in operation handling such products as listed above and below.

EF continuous chain belt conveyor furnaces may be oil fired, gas fired, or electrically heated. They are built in several standard sizes with capacities ranging from 175 to 2000 lbs. per hour. Larger or smaller sizes can also be furnished. Any size can be built for using special protective atmospheres for heat treating without scale or decarburization.

The chain belt conveyor furnace is only one of the numerous types we build. Wire, tubing, strip, castings, forgings, stampings, aircraft and automotive engine parts, and many other products are being uniformly treated in other types of EF production furnaces.

Write us regarding your furnace problems. We specialize on building production furnaces.

Send for circulars showing the chain belt and other types of EF production furnaces

The Electric Furnace Co., Salem, Ohio

Gas Fired, Oil Fired and Electric Furnaces—For Any Process, Product or Production

Scrap Collection

(*Concluded from Page* 121)

material handled is selected to meet conditions in the field, also the conveying velocity is selected to eliminate any possibility of the material settling in the conveying ducts. The horsepower required on a system of this type varies in proportion to the length of the system. However, most installations require relatively low power.

The system as outlined above, collects the chips at the source. Other systems have been installed where the material handled is in the form of long turnings. In this case, however, the scrap turnings are delivered to a central location and are fed manually to a crusher. The crusher then feeds the chips to the conveying system and the chips are blown into storage bins.

A typical Sturtevant system of this type is installed in a large plant in New Jersey. The scrap generated runs heavily to long alloy turnings from automatic lathes and screw machines. This system was installed primarily for improved oil reclamation. Turnings, heavily oil coated, are manually taken by elevator two floors up to crushers, and are then spun through oil ringers and discharged to hoppers by gravity, and then blown through a steel pipe to railroad cars.

In this case, no separator is required, as little or no dust is introduced into the system. In all cases, the material must be fed to the system at a fixed, uniform rate.

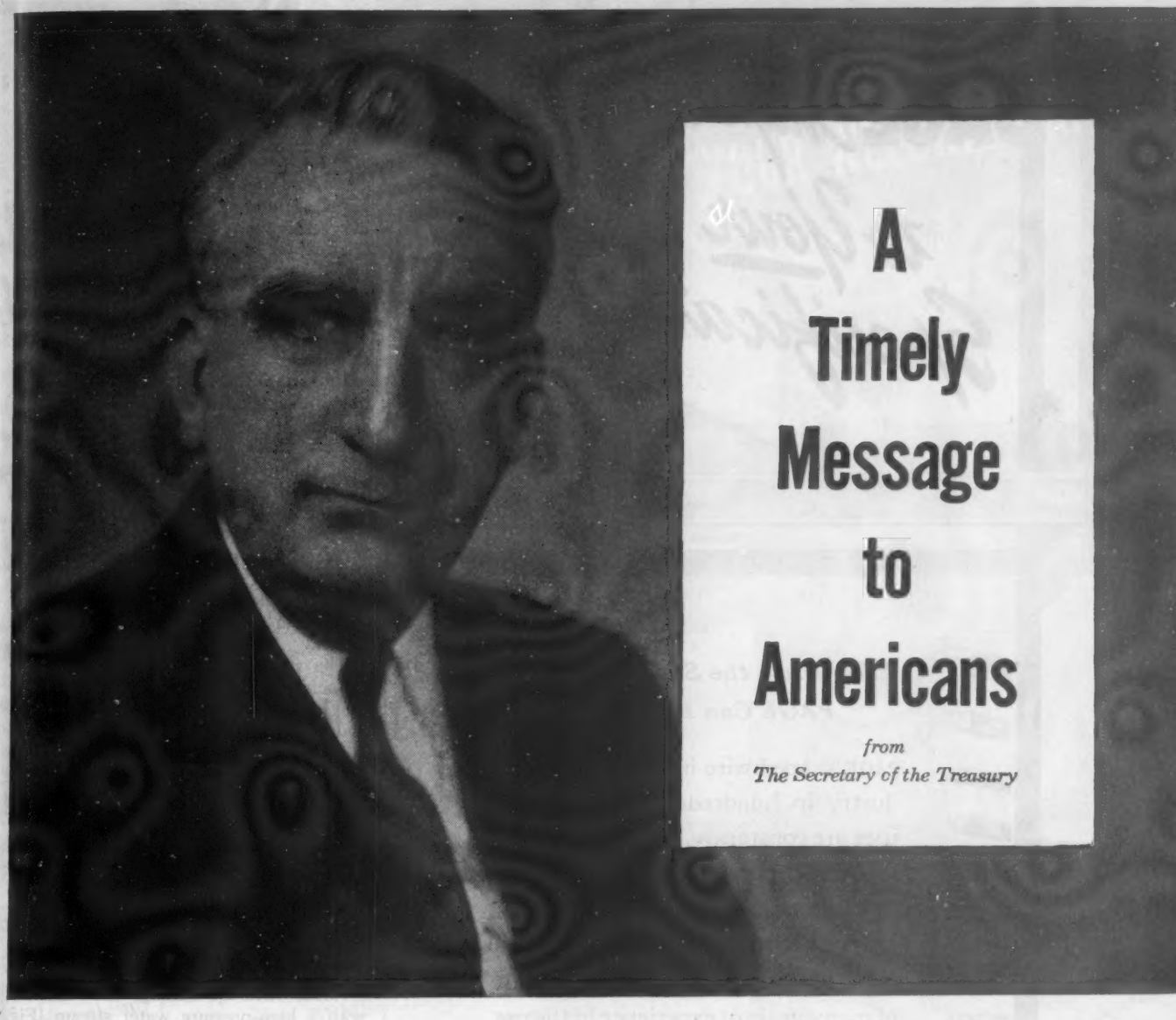
Die Casting Design for High Pressure Production

High-Pressure Die Casting, by H. L. Harvill and Paul R. Jordan; cloth, 130 pages, 7 x 10 inches; published by H. L. Harvill Mfg. Co., Box 335, Vernon Calif., for $5.

Under the subtitle Design Guide for Engineers this volume concerns itself mainly with the design aspects of die casting rather than analysis of the end use of parts produced by this method.

The first 20 pages are devoted to processes of die casting and the metals used, for the benefit of readers with no previous knowledge or experience with die casting techniques. The remainder of the text emphasizes the sizes and types of dies and their degree of complexity and relationship of casting design to die design. With this foundation the volume discusses important elements of correct design of parts to be produced by this method.

A chapter is devoted to discussion of pressure mold or premium quality die castings, with particular reference to recent specifications wherein mechanical properties far higher than any previously adopted by the industry are provided. Simplified methods of machining are discussed and 25 typical castings are discussed, covering a wide variety of metals and types of product, with explanation of the use of the part and those elements of its design which made it successful.



A Timely Message to Americans

from
The Secretary of the Treasury

America has much to be thankful for.

Abroad we have overcome enemies whose strength not long ago sent a shudder of fear throughout the world.

At home we have checked an enemy that would have impaired our economy and our American way of life. That enemy was inflation—runaway prices.

The credit for this achievement, like the credit for military victory, belongs to the people.

You—the individual American citizen—have kept our economy strong in the face of the greatest inflationary threat this nation ever faced.

You did it by simple, everyday acts of good citizenship.

You put, on the average, nearly one-fourth of your income into War Bonds and other savings. The 85,000,000 owners of War Bonds not only helped pay the costs of war, but also contributed greatly to a stable, prosperous postwar nation.

You, the individual American citizen, also helped by cooperation with rationing, price and wage controls, by exercising restraint in your buying and by accepting high wartime taxes.

All those things relieved the pressure on prices.

THE TASK AHEAD

We now set our faces toward this future: a prosperous, stable postwar America—an America with jobs and an opportunity for all.

To achieve this we must steer a firm course between an inflationary price rise such as followed World War I and a deflation that might mean prolonged unemployment. Prices rose more sharply after the last war than they did during the conflict and paved the way for the depression that followed—a depression which meant unemployment, business failures and farm foreclosures for many.

Today *you* can help steer our course toward a prosperous America:

—by buying all the Victory Bonds you can afford *and by holding on to the War Bonds you now have*

—by cooperating with such price, rationing and other controls as may be necessary for a while longer

—by continuing to exercise patience and good sense with high faith in our future.

The challenge to America of switching from war to peace with a minimum of clashing gears is a big one.

But it is a small one compared to the tasks this nation has accomplished since Sunday, December 7, 1941.

Fred M. Vinson
Secretary of the Treasury

A Government message prepared by the War Advertising Council and contributed by this magazine in cooperation with the Magazine Publishers of America.

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PAGE STEEL AND WIRE DIVISION
AMERICAN CHAIN & CABLE

Sodium Hydride Descaling

(*Continued from Page* 123)

generator boxes of ordinary welded steel into which metallic sodium is fed. An ammonia dissociator (Fig. 2) is installed in a separate building from the pickle house, and dissociated ammonia produced bubbles through the molten caustic in the rectangular generator boxes which are open at the bottom. Dissociated ammonia then passes through the metallic sodium which melts when placed on top of the molten caustic in the generator boxes to form the sodium hydride in the solution.

Lids on the generator boxes have vent holes through which excess hydrogen escapes. In order to prevent a critical mixture of air and hydrogen in the portion of the generator boxes extending above the level of the liquid molten caustic, the hydrogen is fed in in such amounts (from 80 to 160 cu ft of "cracked gas" per ton of descaled metal) that there is enough to satisfy the sodium, fill the generator boxes, and burn a flame in the vents, as may be seen in Fig. 3.

The anhydrous ammonia used for the dissociator is provided in cylinders for the Jessop operation. (See Fig. 2.) Anhydrous ammonia, however, can be obtained in tank car lots, and in this form the process would require that much less manual adjustment.

Operating Procedure. After placing a rack of material in the hydride bath for 15 min, it is quenched in water. Steam formed by the metal at 700° F actually blasts loose a substantial amount of reduced oxide in the quench bath. Material usually comes off in the water in large patches, but in other cases is more finely divided. After quenching, work is hosed with a high-pressure water stream (Fig. 1) to further remove reduced scale which, by this time, is fairly loose.

After hosing off the metal, it is given a comparatively short dip (2 min) in a sulphuric acid bath to remove all traces of frozen caustic and loosen remaining scale. This treatment is accomplished in a 5 to 10 per cent sulphuric acid bath. To passivate the stainless steel, and whiten it, work next is placed for 2 to 3 min in a 10 per cent nitric acid bath at 160° F. If material being treated is composite metal, the latter treatment does not over-pickle the backing steel.

Precautions. When using sodium hydride pickling, it is necessary at all times to keep it up to temperature, as the volume of the bath would require a very considerable length of time to remelt should it be allowed to freeze. Generally speaking, the same procedure governing a galvanizing bath (in regard to keeping it in a molten state) is followed. If failure should occur in the heating system, it is necessary to dip out of the tank and into drums as much of the molten caustic as possible before it freezes. This can be remelted when the difficulty is overcome.

Because of the necessity for continually keeping the bath in condition and at

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SE—
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rating:

KVA at 50% duty cycle. Single ase alternating current of one volt- e and one frequency. Power supply ay be 440 or 220 volts, 60, 50 or 25 cles, according to the user's specifi- ations.

performance:

CAPACITY: As a projection welder—6 projections on .080" plus .080"—dis- tance between welds ¾"; projections in accordance with RWMA standards. Maximum current on secondary side, 31,000 amps. with a distance of 11½" between arms. As a spot welder—(elec- trode holders optional equipment) stain- less or clean mild steel from .032" plus .032" up to and including .187" plus .187".

SPEED: 180 welds per minute on .032" plus .032" pickled mild steel.

THROAT DEPTH: 18" from center line of welding ram to face plate.

CLEARANCE BETWEEN ARMS: Lower arm adjustable over a range of 11½". Maximum working space between arms 21".

ELECTRODE STROKE: Adjustable stroke, retractible head, permits a work- ing stroke of ½" with foot controlled re- traction to give a total opening up to 2¾". Selection of constant working stroke, or working stroke with retrac- tion is through toggle switch mounted on control panel. The retraction feature is designed for spotwelding. It may also be used for projection welding if de- sired.

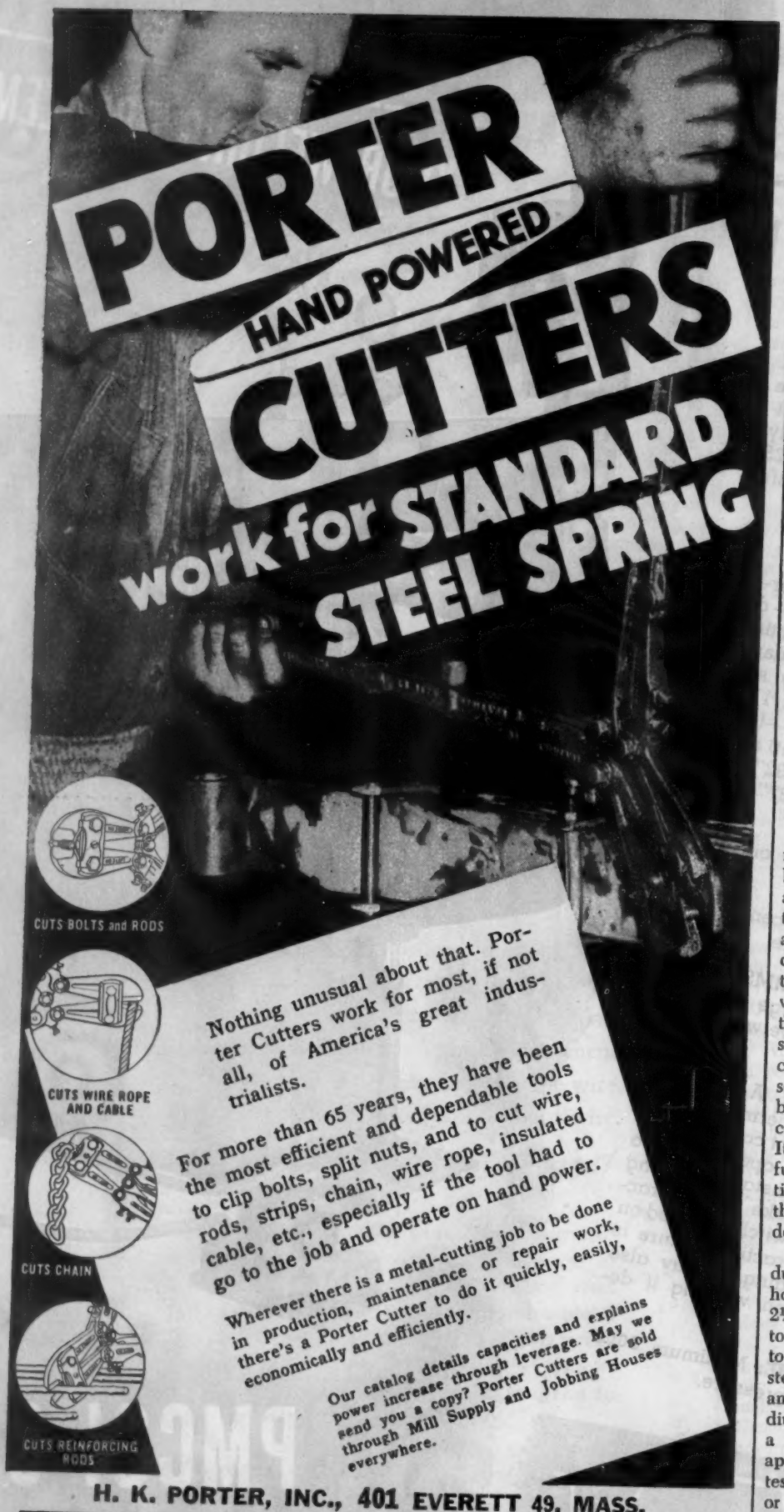
WELDING PRESSURE: Maximum 3000 lbs. for 90 psi. line pressure.

YOUR WELDING PROBLEMS

PMC01-9

projection welder

BULLETIN 120-A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Wherever there is a metal-cutting job to be done in production, maintenance or repair work, there's a Porter Cutter to do it quickly, easily, economically and efficiently.
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temperature, a steady stream of materi must be put through the system in orde to keep the cost per pound to pickl within economic limits. It is essenti to have proper ventilation over the h tank and the quench tank, in the for of powerful draw-out fans, so as insure working conditions that will saf guard employes.

Straight-chromium stainless steels a high chromium-nickel stainless steels c be white pickled by this method wit out sand blasting. We believe this a great advantage afforded by proces

The sodium hydride descaling proce had its laboratory development und Dr. Harvey N. Gilbert, Electrochem icals Department, E. I. du Pont d Nemours & Co. Inc., Niagara Falls, N Y. It is covered by United States Pat ent No. 2,377,876, held by du Pon and now is available to interested com panies either for laboratory or commer cial application, free from license o royalty in the United States. Accordin to Dr. Gilbert, the process went into pro duction immediately upon reaching ful development and has had only mechan ical improvement during the past 4 y It has been in operation at Jessop almo that long. Its extension has been re stricted due to the diversion of sodium for other war purposes, chief of whic was manufacture of tetraethyl lead.

In summation, there are a number o pointers which should be considered i setting up and operating a sodium hy dride pickling unit:

Fused caustic contains moisture an must be dehydrated before hydride ca be formed. This is done only in startin a new bath by placing sodium bricks o the open surface where the sodium melt and floats and skims around in patche due to the evolution of hydrogen fro the water. The hydrogen burns withou violence, and only toward the end o the dehydration period does the sodium show a tendency to burn. Any burnin can be stopped readily by stirring th sodium patch with an iron rod. Whe bath is completely dehydrated, it be comes black and has an oily appearance It produces at this point practically n fumes or gas; however, during dehydra tion, ventilation is desirable to remov the caustic spray formed. Dehydratio does not have to be repeated.

Sodium is added at intervals by intro ducing sodium bricks through the charg hole of the generator box. Normally, on 2½ lb brick is added by means of tong to each generator every 15 min. From to 12 lb sodium is required per ton o steel treated, depending on relative amount of surface to be descaled. So dium hydride content is determined b a simple gas test with a gas evolution apparatus. Sodium feed is increased test is low, decreased if test exceeds or 3 per cent, whichever is maximum desired.

Time of immersion depends on such factors as character of scale, mass o work, etc., and thus can range from few seconds to 20 min.

Advantages of sodium hydride de

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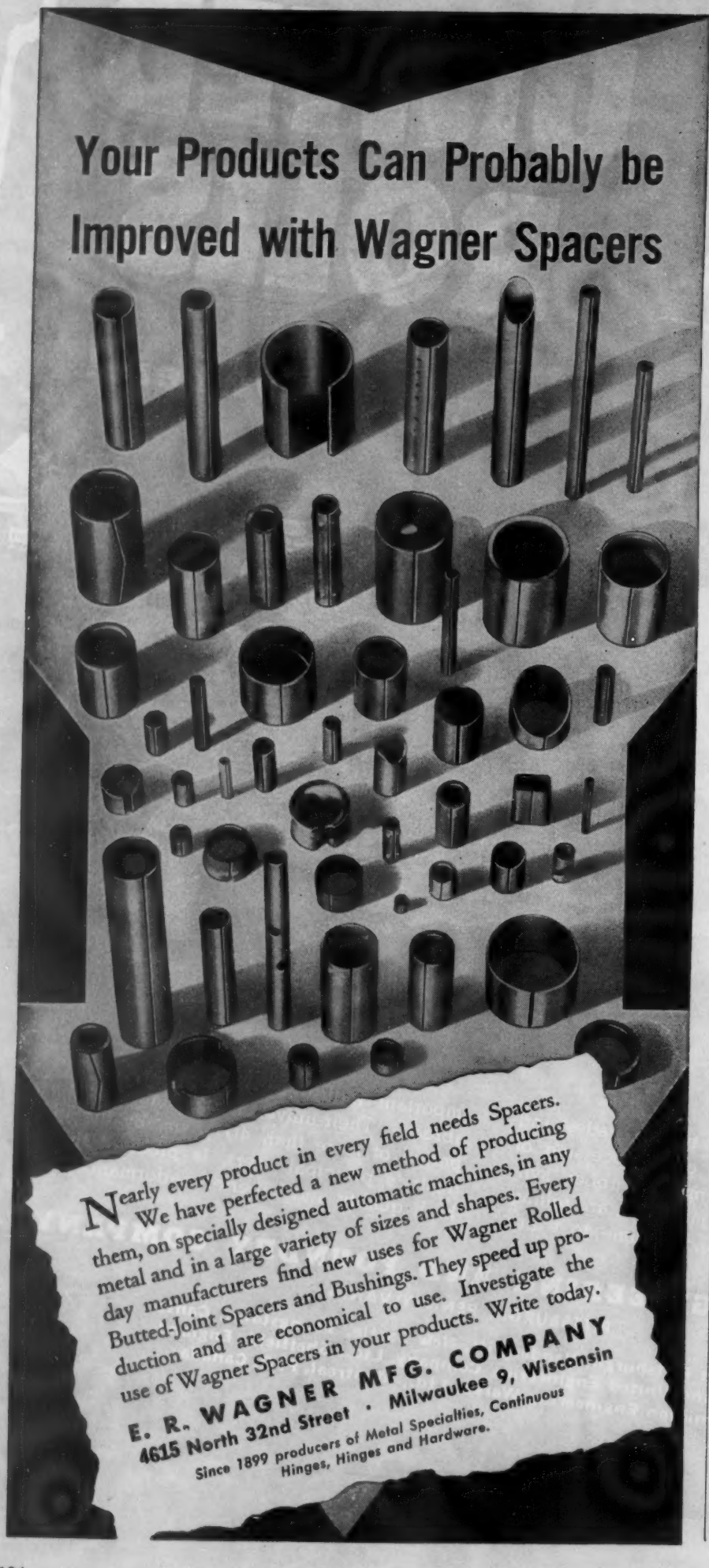
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scaling, rightfully claimed by Dr. Gilbert and borne out by experience here and elsewhere, may be summed up as follows:

—There is no loss of metal, thus eliminating losses of 2 to 3 per cent usually lost in other pickling processes.

—Containing active sodium hydride, bath penetrates through work and produces uniform descaling of all surfaces.

—There is no disposal of waste residue.

—Bath does not produce hydrogen embrittlement of steel.

—All grades of alloy steels can be descaled, and different grades can be descaled interchangeably, using same procedure.

—Hydride bath will not cause pitting of work.

—Working temperature is sufficiently low that structure of metal is not deleteriously affected.

—No electric current necessary.

—Ordinary low-carbon steel tank can be used.

Bulletin Deals With Gaging Precision Holes

Gaging precision holes is discussed in Bulletin No. 31 of Comtor Co., Waitham 54, Mass., entitled "Shock-Absorbing Comtorplug Internal Comparator". Contents include: Description of this principle of gaging holes to fractions of 0.0001-in., providing automatic self-alignment and self-centering of expanding plug gage; illustrations of Comtorplugs; gaging holes in various products and parts; description of sizes and capacities from ¼ to 8-in. diameters and larger, as well as special types with in-reaches up to 17 in. and more.

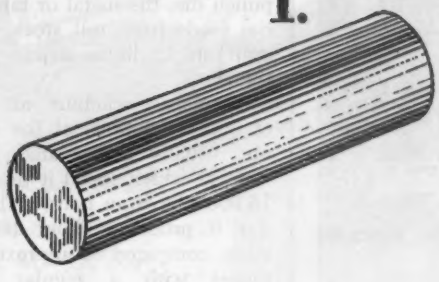
There is also an explanation of interchangeability of all plugs in any amplifier, and there are suggestions for adapting the plug for use by machine operators, bench inspectors, and final inspectors.

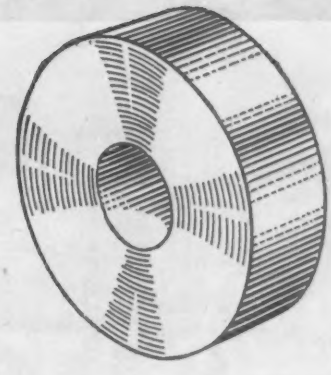
Special Rivets Used To Fasten Porcelain

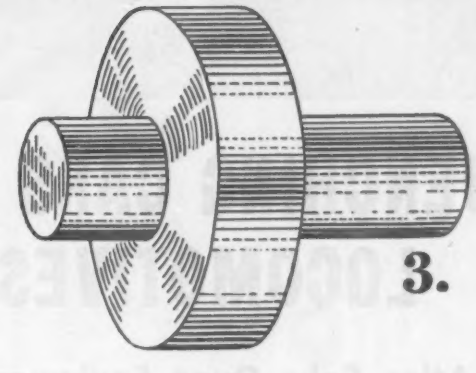
A new use for a one-piece internally threaded and counterbored tubular rivet which can be used as a blind rivet, nut plate for attachment, or both, and can be headed or upset with a simple tool is in the refrigeration industry. Twenty-eight Rivnuts are used on each unit as a nutplate for attaching shelves. They are upset in a finished porcelainized inner shell, where conventional riveting cannot be used because bucking action cracks the porcelain finish. Rivnuts draw up smooth without injury to finish, according to the manufacturer, B. F. Goodrich Co., Akron.

—o—

Soft grit blasting, employing materials such as ground corncobs and rice hulls, was widely used to remove carbon from pistons of military engines during war.







JOINED . . . *by degrees!*

FOR years, *heat* has been used to set collars firmly on shafts—to fit metal parts tightly together. But the high temperatures needed introduce the risk of loss of temper. Additional machining is often necessary.

Now *cold* does the same job . . . faster and better! Low temperatures, to minus 50—100F., cool and contract the inner part. When in place, room temperature secures a final fit. In this way, too, both parts are joined . . . by degrees!

Here is one of the many better, more economical industrial processes developed through refrigeration. G-E equipment has contributed to such applications as treating aluminum rivets to retard ageing, the stabilization of metals, and in other ways controlling the behavior of metals and materials through the use of low temperatures.

This may suggest important ways to improve *your* production. When you want the best in air conditioning and refrigeration . . . see G.E. first! *General Electric Company, Air Conditioning Department, Section 54511, Bloomfield, New Jersey.*

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Making Small Parts

(*Continued from Page* 125)

termination of war work, the presses have been re-converted to automobile part production.

During peak production the larger press, shown in Fig. 1, turned out a million laminations for the aircraft generator (24-v, 200 amp P-1) in a 48-hr week with only one operator.

Designed so that two large balance wheels turn a cam which carries the punch die, the metal or fabricating material feeds from roll stock, or sometimes strip stock, in a steady flow through the dies.

The larger machine, although capable of 800 revolutions of the cam per minute, usually is operated at about 350 rpm, at which speed it turns out at least 15,000 pieces an hour. Thus in an 8-hr day it produces about 120,000 laminations, compared to approximately 50,000 pieces with a regular punch press equipped with an automatic feed, and compared to perhaps 9000 pieces in a hand-fed punch press.

Press Punched Laminations

Principal product of the larger press during the war was generator pole laminations punched from 0.025-in. thick electrical grade steel. The pieces then are fastened together in strips of nearly 200 laminations to form each of the main poles surrounding the armature.

The smaller press, which lends itself more easily to different setups, was used during the war mostly for punching insulating parts for the generator from fish paper and hard vulcanized fiber. About 20 different dies have been rotated through this press, the parts made not being required in such volume as the laminations produced in the larger machine.

Two brass jobs also have been run regularly, using 0.020-in. stock, on the small press. Three steel jobs, with metal ranging from 0.018 to 0.045-in., were also included in the 20 die changes. The latter figure of 0.045-in. is about as heavy as Ford has run metal in the small press and the heaviest gage used in the larger press was 0.090-in. from which parts were made in peacetime for regulator terminals for generator cutouts.

Principal peacetime role of the smaller presses was in the making of miscellaneous cigar lighter parts and insulators for generators, starter switches, regulators and terminals.

The presses are fed by the cam action up to a maximum feed of ¾-in. By using feed rollers the feed can be increased to 3.1416 in. Width of the material is limited to about 8 in., with guide pins being used in the dies to locate the material. Size of the part being manufactured, however, cannot be as large as the area determined by the maximum feed and width, unless it is a cut-off job without guide pins in the dies.

Feed must be adjusted so that material will have time to move in while the dies are swinging apart and clos-

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Dependability

There's more performance than promise in every one of the many types and sizes of Birdsboro Hydraulic Presses. There's more performance because they are soundly designed and engineered to give you maximum production at minimum operating and maintenance cost.

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"AIRGRIP" Non-Rotating Cylinders on Resistance Welding Machine of the Resistance Welder Corp., Bay City, Mich. Either end of the "AIRGRIP" Non-Rotating Cylinder can be removed, leaving rest completely assembled.

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Production capacity is stepped up, makes lap weld seams on 525 cylindrical containers in one hour! — and quality, uniformity and smoothness of welds are improved. "AIRGRIP" Cylinders do four jobs: (1) They clamp the work. (2) They unclamp it. (3) They lock fixtures. (4) They apply welding pressure.

"AIRGRIP" Cylinders have no tie-rods. Ample strength is provided by making the metal of cylinder walls extra thick—⅝ of an inch.

"AIRGRIP" Non-Rotating Cylinders speed production in many ways. Tell us about your machine operations. Our engineers will investigate your requirements and make recommendations.

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When buying new lathes, specify "AIRGRIP" Chucks and Cylinders

ing. The stroke of the dies by the cam action ranges from 0 to 1-in.

Considerable variety of metals has been used in the Ford-operated high speed presses, with successful results obtained with electrical grade steel, cold rolled steel, spring steel, nickel alloy steel, brass and copper.

An interesting feature of the presses is the brake arrangement on the outside of the flywheels which makes it possible to stop the presses from high speed in just a matter of seconds.

It is pointed out by the Pressed Metal Institute that such developments properly used may greatly assist end-product manufacturers in meeting the demand for better, lighter competitively priced consumer appliances and equipment.

Stainless Tanks Heads Spun with 5-Inch Radius

Stainless steel milk storage tanks, built with both inner and outer deep-dished heads spun with a 5-in. knuckle radius, have been developed by Heil Co., Milwaukee. Knuckle radius is curve of head at point where it is joined to the tank shell.

Inner and outer heads are butt-welded to shells and ground smooth and polished to match metal finish. Rounded heads are expected to replace conventional, sharply turned heads, as they are said to be stronger, easier to clean, and present a more pleasing appearance. Tanks with stainless steel spun heads up to 90½ in. in diameter, some of the largest spinnings ever produced, are in service.

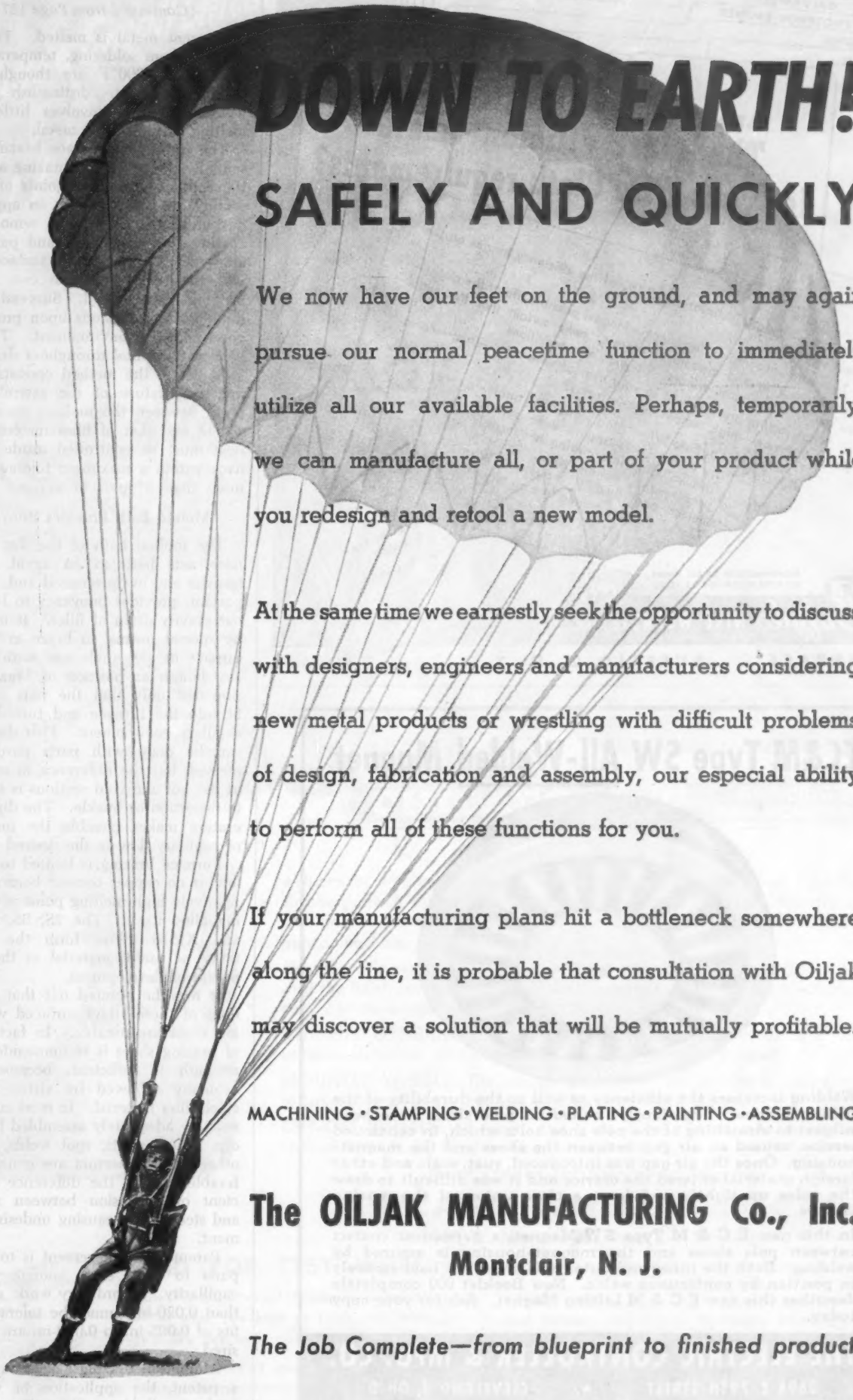
Lincoln Arc Welding Handbook in New Edition

Procedure Handbook of Arc Welding Design and Practice, eighth edition; simulated leather, 1312 pages 6 x 9 inches, 1647 illustrations; published by Lincoln Electric Co., Cleveland, for $1.50 in the United States, $2 elsewhere.

Entirely revised to include latest data on new arc welding methods, the eighth edition of this work presents details of recent welding methods and techniques, many of which played an important part in winning the war. It contains a wealth of new information that obsoletes much previous literature on welding.

This edition contains new cost tables and welding techniques, mathematical calculations for new weld-designed structures, latest steel specifications on SAE, AISI and NE steels, underwater cutting, shop ventilation, maintenance of welding equipment, methods of testing and filler metal specifications for arc welding electrodes.

The several parts cover such subjects as: Welding methods and equipment; technique of welding; procedure, speeds and costs; weld metal and methods of testing; weldability of metals; welded steel construction; designing of arc welded structures, and typical applications of arc welding.



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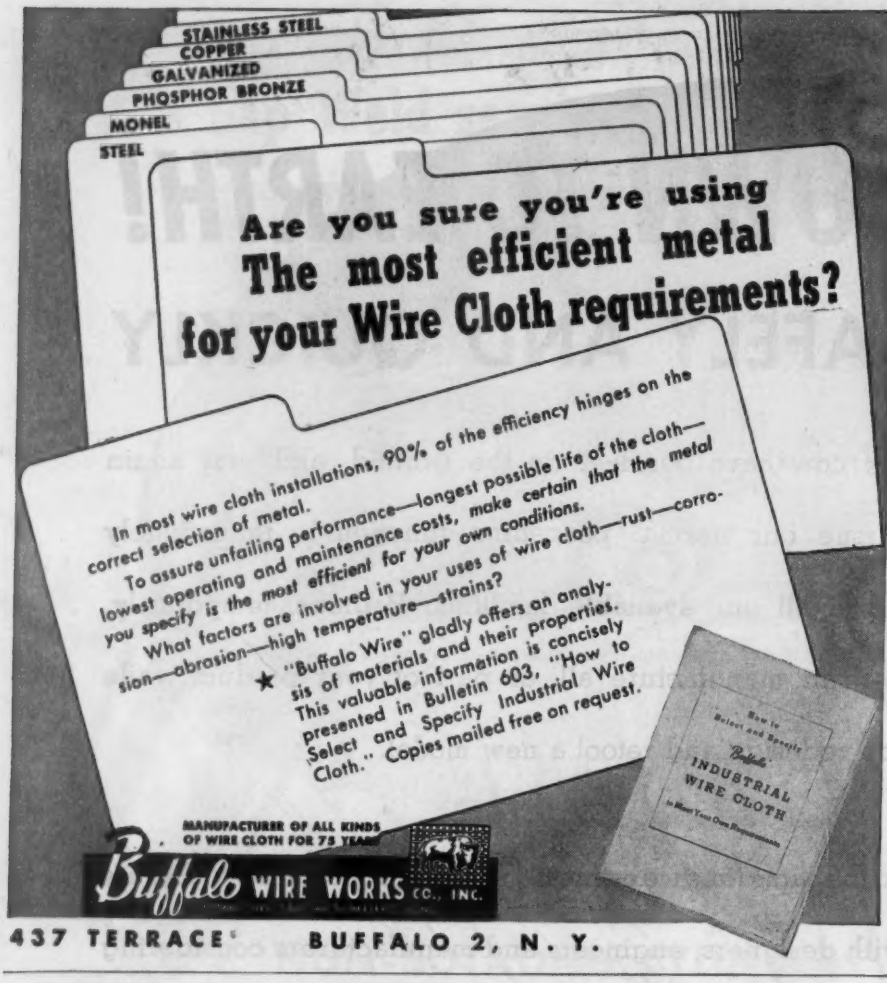
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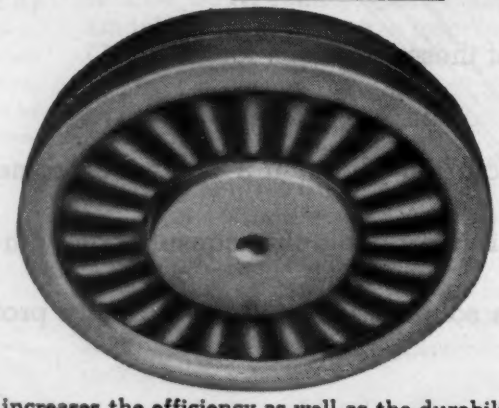
EC&M Type SW All-Welded Magnet



Welding increases the efficiency as well as the durability of the Lifting Magnet. Previously, bolted-on pole shoes have been subject to stretching of the pole shoe bolts which, in continued service, caused an air gap between the shoes and the magnet-housing. Once the air gap was introduced, rust, scale and other foreign material entered the crevice and it was difficult to draw the poles up tightly and form a close union of the mating surface.

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Flux Bath Brazing

(*Continued from Page* 127)

the parent metal is melted. To distinguish it from soldering, temperatures of more than 1000°F are thought of as brazing heats; to distinguish it from welding, brazing involves little or no melting of the parent metal.

The process of furnace brazing is essentially a recasting of brazing alloy into the capillary spaces or joints of the assembly. To permit this, an appropriate flux must first be used to remove oxide coating from both filler and parent and allow the filler to wet the surfaces. Filler will then join with the two surfaces, forming a solid bond. Successful aluminum brazing depends upon providing a good capillary environment. This must be borne in mind throughout designing.

In detail, the method consists of raising temperature of the assembly to a point between the melting point of the parent and that of filler material. This heat must be controlled inside the furnace within a maximum tolerance of no more than 5° plus or minus.

Molten Bath Provides Buoyancy

The molten bath of the flux dip furnace acts both as an agent for heat transfer and oxide removal and, most important, provides buoyancy to help combat gravity drain of filler. It is possible by special means, to braze in this type furnace at any angle and with virtually any length or position of brazed seam, provided only that the part itself will fit into the furnace and furnishes good capillary environment. Flux dip brazing can be done with parts partially immersed, but the difference in expansions of the hot and cold sections is conducive to distortion or buckle. The dipping operation makes possible the inducement of capillary flow in the desired direction.

Furnace brazing is limited to alloys of low or no copper content because of the relatively high melting point of the brazing alloy itself. The 2S, 3S, 61S, 53S and XJ51S alloys form the practical range of useful material at the present period of development.

It may be pointed out that combinations of these alloys surfaced with brazing sheet are useable. In fact, the use of brazing sheet is recommended, where strength is sufficient, because of the economy achieved by virtue of prelocated filler material. In most cases, parts must be adequately assembled before the dip. Tack rivets, spot welds, tabs and other firm connectors are generally preferable to jigs, the difference in coefficient of expansion between aluminum and steel in jigs causing undesired movement.

Paramount requirement is to bring all parts to a fit close enough to insure capillarity. In ordinary work, gaps more than 0.020-in. cannot be tolerated. Slip fits of 0.005-in. to 0.010-in. are to be desired.

Aluminum Brazing Co. has applied for a patent, the application of which affords excellent capillary flow in joints

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ordinarily difficult to braze. This consists of a heavy knurl mechanically impressed into one of the two juxtaposed surfaces of sheets. When it is used on either lap or perpendicular joints a series of parallel fillets of great strength are developed during the brazing operation.

Knurled sheet may be pressed into the juxtaposed sheet tightly, providing a series of parallel, nearly half-round capillary ducts, which is not true of ordinary lap joints. The same problem, however, may be overcome with certain applications by means of relieved edges and provision for fillets other than knurling.

Such flux-dip brazing results in a single homogeneous piece of aluminum. A plainer way of expressing the idea is to think of the phrase "recasting into capillary environment."

This method is definitely indicated where work calls for the joining of many small parts with total brazing seams amounting to great lengths. It is not so readily applicable to the joining of large parts where production time is not so important a factor.

Some of its obvious advantages are: (1) Greater neatness of completed joints, (2) accessibility on intricate assemblies, (3) lack of localized heat, hence absence of varying expansions, eliminating buckle, (4) savings in weights, (5) softer, easily formed alloys are annealed and may be concurrently heat-treated during the brazing operation.

Costs Remain Static

Costs remain practically static regardless of the amount of seam included in the assembly, pointing to particular advantage where considerable joining is required in a small space or in a restricted area. It is often possible to braze thin sections easily that are difficult or impossible to join by other methods. Qualities of lightness, workability and strength necessarily arise from the advantages listed above.

One great superiority in the method is reflected in its inherent lowness of cost. This is so where sufficient volume is available to amortize dipping jigs and to facilitate the use of conveyor mechanism for cleaning, preheating and dipping. The most expensive single item encountered is the brazing flux, the heart of the process. Parts therefore should be designed to bring about easy pour-off of molten flux before removal from the brazing chamber.

The following parts, representing a limited selection of a very large potential, lend themselves uniquely to flux dip furnace brazing:

Radiator and intercooler systems, watertight junction boxes, gasketed and sealed instrument boxes, aircraft carburetor ducts, camera cases, steam heated irons, numerous castings when substitution of cheaper and stronger wrought sections may be indicated, and in general any item requiring considerable joining in relation to its total bulk or requiring simple joining but in production quantities.

Aluminum welding techniques are several years old. Hand methods have heretofore been predominant in the joining of these light, strong alloys. Flux-dip furnace operations, which make for greater accuracy and neatness, are now well defined doors to future production of aluminum parts in masses.

Up to now, relatively few companies have studied the flux-dip method of brazing aluminum. Among these may be mentioned the Harrison Radiator Division of General Motors Corp., Lockport, N. Y., and Aluminum Co. of America, New Kensington, Pa. The American Welding Society in New York City also has made contributions to the research data. In addition, there may be a few other concerns, large and small, which have made progress in the method, but with results still unannounced.

In the opinion of the owners of the Aluminum Brazing Co., there appears little doubt but that a vast spurt soon will be seen in the use of the operation of aluminum brazing through flux-dip.

Handbook on Problems of Machinists and Draftsmen

Machinists' and Draftsmen's Handbook, by Albert M. Wagener and Harlan R. Arthur; cloth, 662 pages, 5¼ x 8 inches; published by D. Van Nostrand Co. Inc., 250 Fourth Ave., New York, for $4.50.

The authors have attempted to present in one volume of convenient size a reference work for machinists and draftsmen that will contain all the basic information required in most daily assignments. A critical selection of material has been made, necessitating omission of much that might be considered important, but the effort has been made to present illustrations, examples and solutions to standard problems, especially those of a mathematical nature.

Many solutions of elementary mathematical problems are presented in detail since while most men in the craft have studied mathematics it is quickly forgotten by most. Sections devoted to strength of materials, mechanics and logarithms have been revised to meet latest conditions.

Canadian Mines Listed

Canadian Mines Handbook, 1945; paper, 320 pages, 5¼ x 7¼ inches; published by Northern Miner Press Ltd., 122 Richmond St. West, Toronto, Ont., for $1.

In this book 7100 companies and syndicates engaged in mining in Canada are listed. Part I gives details on 1300 active corporations, including 559 formed in the past year and Part II deals with 5800 others, most of which are quiescent.

A review is given of the position of operating companies in comprehensive detail, with five-year comparisons of output, earnings and other essential information. A long-range table of quotations on the Toronto Stock Exchange includes prices to June 30, with schedules of brokers' commissions, government transfer taxes, etc.

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THE BUSINESS TREND

Notable Gains Are Made In Industrial Activity

NOTABLE gains are being registered in industrial activity now that some of the most crippling strikes have been cleared away.

Backed-up demand for goods is so great that production surges ahead whenever given an opportunity. Hampering of production by labor strife tended to intensify the pent-up demand for goods, although loss of income to employees affected by strikes undoubtedly had some effect, though slight, in retarding the further swelling of demand.

Showing outstanding gains in the latest week were steel ingot production, coal output, and automobile assemblies, all of which in recent weeks had been affected adversely by strikes.

STEEL—With its fuel supply replenished now that coal miners have returned to work, the steel industry is pushing its ingot production rate back toward the high level prevailing before the miners' strike.

COAL—In the first full week of work after the miners' strike, production of bituminous coal jumped 107 per cent over the previous week. Output in the week ended Oct. 27 was 12 million tons, compared with only 5,780,000 in the previous week.

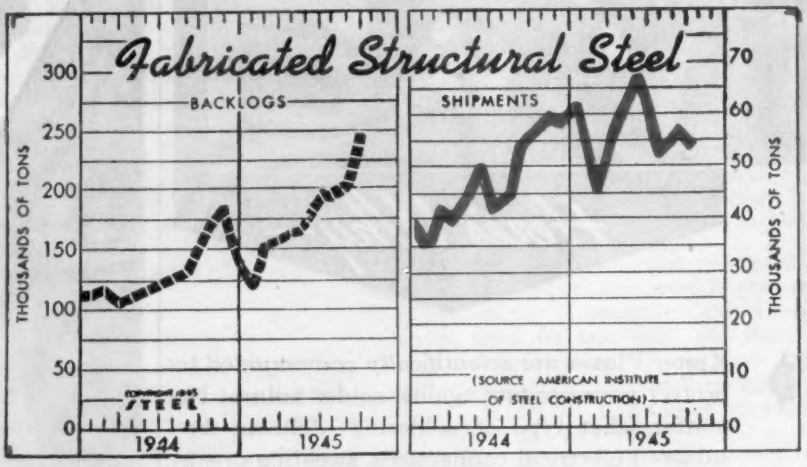
AUTOS—Automobile production of 27,320 units in the week ended Nov. 3 not only was 32 per cent higher than that of the previous week but was the highest since the end of the first quarter of 1942.

CONSTRUCTION—Also encouraging is civil engineering construction volume which in October was 88 per cent greater than in the corresponding month of 1944. Average volume of $59,859,000 for each of the four weeks of October, 1945, was the highest reported since July, 1943.

CASTINGS—Reflecting the end of war, production and shipments of gray iron castings in August reached new low levels for 1945, although the declines from July were moderate. Likewise, unfilled orders for gray iron castings in August were at a new low for the year. From July, production in August declined 2.7 per cent, shipments 1 per cent, and unfilled orders 7 per cent.

COKE—Also showing a decline is the September coke output which was off 4.2 per cent from August. Production of beehive coke dropped 34.2 per cent from July, but output of by-product coke, which represented 94 per cent of the total production, declined only 1.5 per cent.

LIVING COSTS—The second consecutive monthly decline from a 24-year high in living costs for the average family of wage earners and lower-salaried clerical workers in the United States was recorded in September when the decrease was 0.4 per cent, the National Industrial Conference Board reported.



Fabricated Structural Steel
(1000 tons)

	Shipments			Backlogs		
	1945	1944	1943	1945	1944	1943
January	55.0	35.2	91.9	124.4	113.1	339.1
February	47.8	42.9	90.8	151.6	117.6	321.0
March	58.4	41.4	94.0	153.3	106.3	299.8
April	59.4	44.5	86.6	162.5	111.2	272.5
May	67.1	50.7	78.9	165.7	116.3	220.6
June	63.0	43.0	68.4	195.2	122.7	207.1
July	54.4	45.3	56.8	194.0	125.4	201.8
August	56.8	55.2	50.2	201.1	130.4	195.6
September	53.7	57.5	51.8	248.5	151.1	208.1
October	....	61.6	80.1	.....	174.4	274.0
November	....	59.4	42.7	.....	184.2	134.6
December	....	61.3	39.6	.....	142.5	113.0

Source: American Institute of Steel Construction. Figures represent members' reports only.

FIGURES THIS WEEK

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)	73	65	82	95.5
Electric Power Distributed (million kilowatt hours)	3,934†	3,937	4,028	4,355
Bituminous Coal Production (daily av.—1000 tons)	2,000	968	1,822	2,035
Petroleum Production (daily av.—1000 bbls.)	4,318	4,273	3,621	4,720
Construction Volume (ENR—Unit $1,000,000)	$87.8	$58.4	$74.7	$32.4
Automobile and Truck Output (Ward's—number units)	27,320	20,675	9,500	21,595

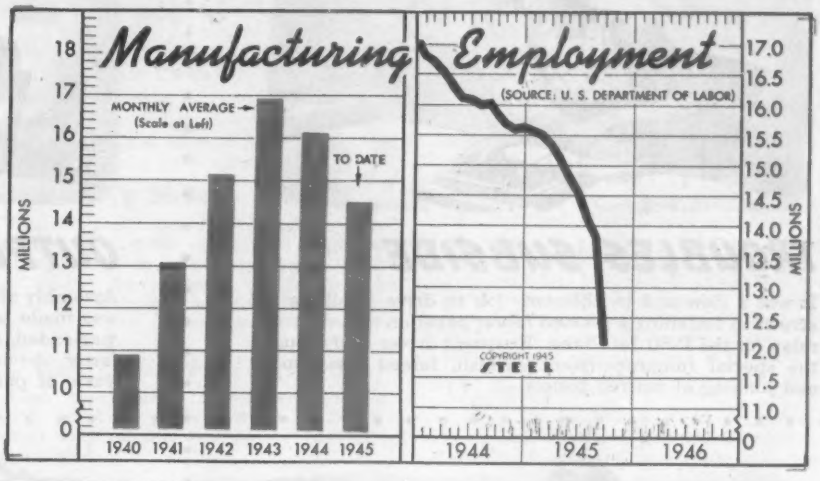
*Dates on request. †Preliminary.

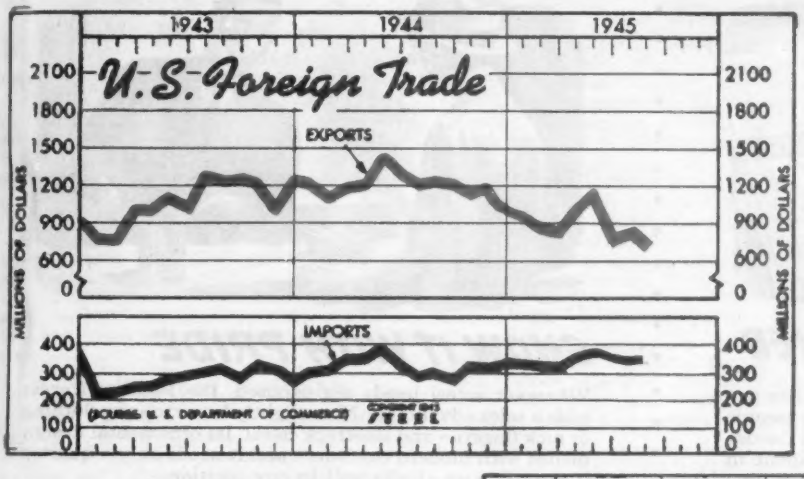
TRADE				
Freight Carloadings (unit—1000 cars)	857†	855	768	893
Business Failures (Dun & Bradstreet, number)	17	17	13	11
Money in Circulation (in millions of dollars)‡	$28,026	$27,974	$27,853	$24,409
Department Store Sales (change from like week a year ago)‡	+12%	+14%	+7%	+11%

†Preliminary. ‡Federal Reserve Board.

Factory Employment
(000 omitted)

	1945	1944	1943
January	15,555	16,825	16,423
February	15,517	16,735	16,599
March	15,368	16,559	16,747
April	15,102	16,309	16,774
May	14,811	16,122	16,753
June	14,538	16,093	16,908
July	14,136	16,013	17,059
August	13,813	16,023	17,182
September	12,149	15,843	17,136
October	.....	15,692	17,194
November	.....	15,607	17,238
December	.....	15,632	17,080
Monthly Ave.	.....	16,121	16,924



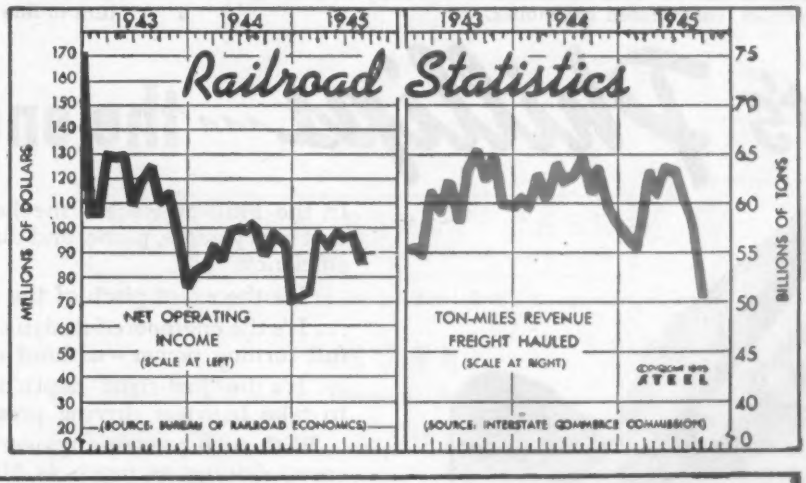


Foreign Trade
Bureau of Foreign and Domestic Commerce
(Unit Value—$1,000,000)

	Exports			Imports		
	1945	1944	1943	1945	1944	1943
Jan.	900	1,124	730	334	300	228
Feb.	882	1,086	719	324	313	234
Mar.	881	1,197	988	324	359	249
Apr.	1,002	1,182	980	366	359	258
May	1,133	1,419	1,085	372	386	281
June	866	1,271	1,002	360	330	295
July	883	1,198	1,262	356	293	300
Aug.	730	1,207	1,204	358	302	315
Sept.	....	1,199	1,235	...	280	285
Oct.	....	1,140	1,195	...	327	329
Nov.	....	1,184	1,074	...	322	317
Dec.	....	934	1,244	...	336	281
Total	....	14,141	12,718	...	3,907	3,372

Statistics of Class I Railroads

	Net Operating Income			Ton-Miles Revenue Freight		
	1945	1944	1943	1945	1944	1943
	(millions)			(billions)		
Jan.	$73.0	$84.9	$105.3	56.8	60.5	55.1
Feb.	73.2	84.5	105.8	55.3	59.3	54.4
Mar.	99.9	92.5	129.7	62.9	62.7	61.2
Apr.	91.9	87.7	128.7	61.6	60.4	59.1
May	99.9	98.5	129.5	64.6	64.0	62.1
June	96.1	99.8	109.0	63.6	62.0	58.0
July	97.1	98.6	127.8	60.1	62.8	63.7
Aug.	86.7	101.4	132.3	56.4	64.5	65.1
Sept.	....	89.1	110.3	50.4	61.0	62.5
Oct.	....	97.3	113.1	....	63.5	65.0
Nov.	....	91.6	96.4	....	59.4	59.9
Dec.	....	69.8	76.9	....	57.3	60.6
Ave.	....	$91.3	$113.7	....	61.5	60.6



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$11,358	$11,413	$11,425	$10,629
Federal Gross Debt (billions)	$262.0	$262.0	$262.4	$211.8
Bond Volume NYSE (millions)	$36.3	$28.9	$31.8	$35.9
Stocks Sales, NYSE (thousands)	9,464	6,403	8,744	3,868
Loans and Investments (billions)†	$61.0	$61.1	$61.3	$54.1
United States Gov't. Obligations Held (millions)†	$45,458	$45,471	$45,140	$40,092

†Member banks, Federal Reserve System.

PRICES

STEEL's composite finished steel price average	$58.27	$58.27	$58.27	$56.73
All Commodities†	105.7	105.5	105.0	103.9
Industrial Raw Materials†	117.4	116.9	115.7	113.5
Manufactured Products†	101.9	101.9	101.8	101.1

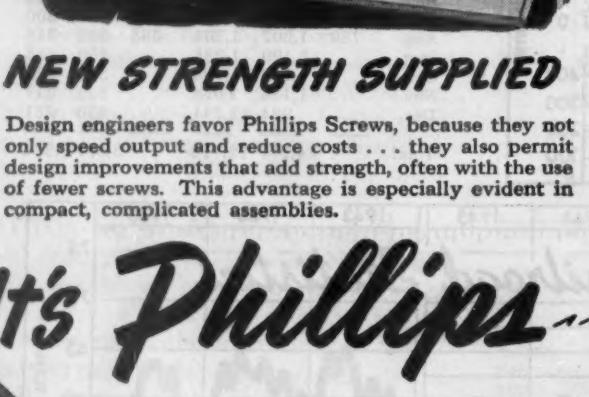
†Bureau of Labor Statistics Index, 1926=100.

TROUBLES SUBSIDE

It was a slow and troublesome job to drive small slotted screws in fastening a pressed fabric panel on this electrical relay for the P-80 Jet Plane. Frequent driver skids gouged the special fungus-resistant varnish, forced disassembly and junking of marred panels.

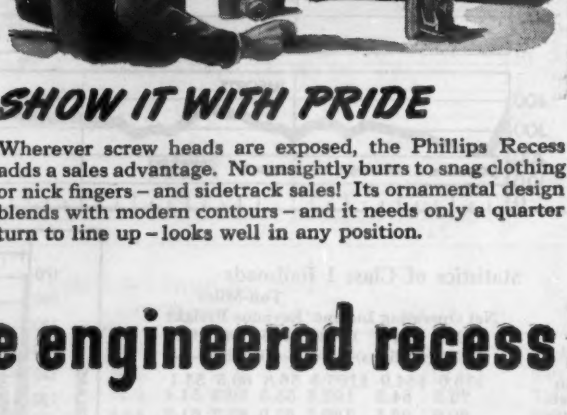
OUTPUT HITS STRIDE

Assembly of this part was speeded up 400% when a change was made to Phillips Recessed Head Screws. Fumbling was ended, and a spiral driver could be used, permitting faster driving. Driver skids were eliminated, along with waste of parts and time for disassembly and reassembly.



NEW STRENGTH SUPPLIED

Design engineers favor Phillips Screws, because they not only speed output and reduce costs . . . they also permit design improvements that add strength, often with the use of fewer screws. This advantage is especially evident in compact, complicated assemblies.



SHOW IT WITH PRIDE

Wherever screw heads are exposed, the Phillips Recess adds a sales advantage. No unsightly burrs to snag clothing or nick fingers – and sidetrack sales! Its ornamental design blends with modern contours – and it needs only a quarter turn to line up – looks well in any position.

It's Phillips . . . the engineered recess!

In the Phillips Recess, mechanical principles are so correctly applied that every angle, plane, and dimension contributes fully to screw-driving efficiency.

. . . It's the exact pitch of the angles that eliminates driver skids.

. . . It's the engineered design of the 16 planes that makes it easy to apply full turning power – without reaming.

. . . It's the "just-right" depth of recess that enables Phillips Screw Heads to take heaviest driving pressures.

With such precise engineering, is it any wonder that Phillips Screws speed driving as much as 50% – cut costs correspondingly?

To give workers a chance to do their best, give them faster, easier-driving Phillips Recessed Head Screws. Plan Phillips Screws into your product now.

PHILLIPS *Recessed Head* SCREWS

WOOD SCREWS • MACHINE SCREWS • SELF-TAPPING SCREWS • STOVE BOLTS

Made in all sizes, types and head styles

25 SOURCES

American Screw Co., Providence, R. I.
Atlantic Screw Works, Hartford, Conn.
The Bristol Co., Waterbury, Conn.
Central Screw Co., Chicago, Ill.
Chandler Products Corp., Cleveland, Ohio
Continental Screw Co., New Bedford, Mass.
The Corbin Screw Corp., New Britain, Conn.
General Screw Mfg. Co., Chicago, Ill.
The H. M. Harper Co., Chicago, Ill.
International Screw Co., Detroit, Mich.
The Lamson & Sessions Co., Cleveland, Ohio
Manufacturers Screw Products, Chicago, Ill.
Milford Rivet and Machine Co., Milford, Conn.
The National Screw & Mfg. Co., Cleveland, Ohio
New England Screw Co., Keene, N. H.
Parker-Kalon Corp., New York, N. Y.
Pawtucket Screw Co., Pawtucket, R. I.
Pheoll Manufacturing Co., Chicago, Ill.
Reading Screw Co., Norristown, Pa.
Russell Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Scovill Manufacturing Co., Waterville, Conn.
Shakeproof Inc., Chicago, Ill.
The Southington Hardware Mfg. Co., Southington, Conn.
The Steel Company of Canada Ltd., Hamilton, Canada
Wolverine Bolt Co., Detroit, Mich.

HELPFUL LITERATURE

1. Carbide Tipped Tools

Spe-D-Cut Tool Co.—26-page illustrated catalog No. R-20 contains ordering instructions, prices and specifications on complete line of carbide tipped cutting tools. Included in line are tool bits, boring tools, centers, cut-off tools, fly cutters, milling cutters, roller turning tools, router bits and special tools. Engineering data related to machining ferrous, nonferrous and nonmetallic materials are included.

2. Small Turret Lathes

South Bend Lathe Works—12-page illustrated catalog No. 901 covers series 900 and 1000 South Bend turret lathes which have swings of 9¼ and 10-1/8 inches over beds and saddle wings, respectively, and ½ and 1-inch maximum collet capacities. Standard equipment includes hand lever cross slide and turret, compound cross slide, universal carriage, quick change gear box and coolant equipment.

3. Portable Electric Tools

Skilsaw, Inc.—44-page illustrated catalog of "Portable Electric Skil Tools" gives full specifications of line of portable electric drills, saws, disc sanders, grinders, belt sanders, shears and nibblers. Hints are given on care and use of portable electric tools to obtain maximum performance and service from them.

4. Acetylene Generator

Sight Feed Generator Co.—16-page illustrated bulletin "Sight Feed Saves 50% to 75% on Acetylene Costs" shows savings which can be effected through use of acetylene generators in small, medium and large shops, as well as in industrial plants using gas welding and cutting equipment.

5. Corrosionproof Materials

U. S. Stoneware Co.—16-page illustrated bulletin H gives information and applications of corrosion resistant materials and equipment. Included are Tygon formulations, tank and lining materials, flexible tubing, gasketing, paint, liquids, chemical stoneware, masonry, mixing equipment and towers and tower packing.

6. Electrical Controls

United Electrical Controls Co.—12-page illustrated condensed catalog and price list No. 4591-C describes thermostats, pressure switches, vacuum switches and close differential switches, and includes ordering information, electrical ratings and other information.

7. Plating Equipment

Udylite Corp.—Three illustrated bulletins "Udylite Cathode Rod Agitator," "Udylite Dipping Baskets" and "Udylite Ball Anodes" describe briefly advantages of these plating accessories.

8. Alloy Containers

Stanwood Corp.—12-page illustrated bulletin No. 15 presents line of fabricated alloy containers and work holders for handling parts through heat treating, quenching, pickling, degreasing, rustproofing baths and similar operations. Carburizing boxes and retorts are also shown.

9. Drill Chucks

K. O. Lee Co.—8-page illustrated booklet entitled "Knock-Out Drill Chucks" contains specifications and prices of drill chucks, arbors and adapters which can be used on drills, presses and lathes. Data on disassembling of chuck are also given.

10. Steam Jet Ejectors

Ross Heater & Mfg. Co.—6-page illustrated bulletin No. 6509 lists industrial applications and presents engineering data on standard single-stage steam jet ejector. This vacuum producing unit is designed for exhausting air, gases or vapors from many types of equipment in numerous industrial processes. Usual economical limit for unit is 26 inches of mercury vacuum, but higher vacuum can be obtained.

11. Blow Torches

Turner Brass Works—Loose-leaf type illustrated bulletin describes blow torches and presents recommended methods of handling and maintaining. Price list is included.

12. Heating Boilers

Titusville Iron Works Co.—8-page illustrated bulletin No. B-3000 contains diagrams and engineering data on both hand and mechanically fired boilers. Specifications, dimensional tables and structural features are included for nineteen sizes designed for use with all fuels and all types of firing.

13. Nonferrous Forgings

Titan Metal Mfg. Co.—8-page illustrated folder, bulletin No. 145, shows typical hot pressed brass and bronze forgings. Advantages are outlined.

14. Crush Form Grinding

Thompson Grinder Co.—16-page illustrated booklet is entitled "Facts About Crush Form Grinding Precision Contours". Development, applications and advantages of "Thompson Truforming" on surface grinders engineered for crush form contour grinding are covered.

15. Spot Welding

Taylor-Winfield Corp.—8-page illustrated bulletin SP-3 "Single Impulse and Pulsation Spot Welding of Low Carbon Steel" describes equipment, setup and procedure for this type of welding. Welding data charts are included.

16. Gas Quenching

Surface Combustion Corp.—4-page illustrated bulletin SC-126 describes "Surface Super-fast Gas Quench" for use where rates faster than air but slower than oil are required. Technical data are included and charts describe process.

17. Angle Beveling Machine

Thomas Machine Mfg. Co.—4-page illustrated bulletin No. 308 covers specifications of angle beveling machine for handling angles up to 10 x 8 x 1-inch; 12-inch channels with 4-inch flange; bulb angles up to 10 inches with 5-inch flange; and Z bars with 6-inch to 10-inch web and 3½-inch to 4-inch flange.

18. Threadcutting Screws

Shakeproof, Inc.—4-page illustrated folder No. 5 shows typical applications of Shakeproof type 1 thread-cutting screws. These fastening devices cut their own threads in metal of any thickness and remain tightly in place.

19. Industrial Furnaces

W. S. Rockwell Co.—Three illustrated bulletins Nos. 419, 417 and 413-G contain descriptions of gas, oil or electric roller hearth furnaces; Kleenmetal oven furnaces for use with protective atmospheres; and standard gas-fired oven furnaces, respectively. Operational advantages, specifications, typical uses and other data are included.

20. Special Rolled Shapes

Lukenweld, Inc.—8-page illustrated booklet No. 272 describes company's facilities for producing rolled shapes ranging from 10 to 30 ft. in length, 4 to 18 in. in width and 1 to 5½ in. in thickness. Carbon and alloy steels as well as nonferrous metals are used.

21. Belt Matching Machine

Smith Power Transmission Co.—4-page illustrated bulletin No. FVM-124 describes Flexoid V-belt matching machine which provides means for measuring length of V-belt under tension equivalent to operating condition. This makes possible use of matched sets of V-belts to yield maximum life and performance.

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22. Grinding Wheels

Sterling Grinding Wheel Div., Cleveland Quarries Co.—12-page illustrated booklet presents in cartoon form "Do's" and "Don't's" in handling grinding wheels. Brief descriptions of Sterling grinding wheels are given.

23. Motor Pulleys

Lewellen Mfg. Co.—12-page illustrated catalog No. 40 presents data on variable speed motor pulleys and combination pulleys. Motor speeds and ratings, approximate shipping and net weights, table of belt centers, and dimensions of motor pulley, countershaft unit and adjustable speed pulley are covered.

24. Ring Gaskets

Steel Improvement & Forge Co.—8-page illustrated bulletin No. 45 deals with Gruv-Seal forged iron and alloy ring gaskets to provide pressureproof joints. Features are discussed, standard and special stock sizes are listed, and list prices are included.

25. Boring Tools

State Mfg. & Construction Co.—4-page illustrated folder "Dialset Boring Tools for Production and Economy in Precision Boring" describes boring tool consisting of adapter and three, four or five standard interchangeable inserts designed for specific requirements. Details and dimensions are covered.

26. Stainless Strip Steel

Superior Steel Corp.—30-page illustrated brochure "Superior Stainless Strip Steels" covers properties, analyses and uses of stainless steel strips. It is prepared for designers and fabricators who wish to use them in products. Tables of weights, corrosion resistance and physical and mechanical properties are included.

27. Manufacturing Facilities

Steel Products Engineering Co.—20-page illustrated bulletin describes engineering and manufacturing facilities of this company which are available for the production of precision metal parts, assemblies and complete machines.

28. Conveyors

Standard Conveyor Co.—12-page illustrated bulletin No. 66 contains views of various types of conveying equipment in actual use. Gravity and power operated roller conveyors, pneumatic tube service, spiral chutes and belt conveyors are included.

29. Bronze Products

Shook Bronze Corp.—16-page illustrated catalog No. 45 lists physical characteristics, nominal chemical analysis and specifications of bronze bushings, bearings, bar stock and babbitt. Application information is included on all forms of this alloy material.

30. Protective Coating

United Chromium, Inc.—4-page illustrated bulletin "Unichrome Dip" describes protective material and procedure for black and olive drab coatings. Process protects zinc and cadmium against corrosion in single dipping operation at room temperature.

31. Inspection Magnifier

George Scherr Co.—4-page illustrated bulletin describes Magni-Ray lighted inspection magnifying unit which is adaptable to wide range of checking, assembling, inspection and safety purposes.

32. Electric Timers

C. H. Stoelting Co.—4-page illustrated bulletin No. 1100 describes table and wall model stop clocks, precision chronoscopes, combination timers and impulse counters, and spring wound x-ray timers. Circuit diagrams showing correct methods of connecting timers in various test circuits are included.

33. Materials Handling

Towmotor Corp.—36-page illustrated pocket-size booklet "Materials Handling Analysis Guide" discusses materials handling from executive viewpoint. Three sections of booklet are: "How to Tell If You Need Better Handling Methods", "Analyzing the Problem", and "Determining the Solution to Your Problem".

34. Twist Drills

Republic Drill & Tool Co.—156-page illustrated catalog No. 4-D contains list prices and specifications on line of twist drills which includes high speed taper shank, straight shank, automotive, aircraft, combination, Coe's, Silver & Deming, ratchet and roll forged drills. Drill drivers for shankless forged drills, carbon steel drills, sleeves and sockets, and special purpose drills are covered. Manufacturing facilities of plant are described and technical section presents engineering data.

35. Industrial Ovens

Gehnrich Oven Div., W. S. Rockwell Co.—12-page illustrated bulletin No. 115 describes Gehnrich line of ovens for uniform heat treatment of ferrous and nonferrous products. Ovens are adaptable for aging, air tempering, annealing, bluing, drawing, heat treating, normalizing, preheating, stress relieving and other heat processes to 1250 F.

36. Variable Speed Drive

Reeves Pulley Co.—20-page illustrated catalog No. V-440 contains complete data on the Reeves Vari-Speed motor pulley which is built in eleven sizes for transmitting from ⅛-horsepower to 15-horsepower and provides infinite speed adjustability over ratios of 2¼:1 to 4:1. Engineering and application information is included.

37. Extruded Aluminum

Reynolds Metals Co., Aluminum Div.—8-page bulletin No. 35-A lists manufacturing methods, alloys and tempers, dimensional tolerances, chemical composition, physical properties and other engineering data on complete line of aluminum extruded shapes.

38. Needle Bearings

Torrington Co.—153-page illustrated "Needle Bearing Engineering and Application Data" handbook, edition No. 32, supplies pertinent information on various types of needle bearings. Typical applications of these bearings are shown. Specifications, tolerances, design factors, installation and inspection data, standards and other data are included.

39. Production Facilities

Searles Electric Welding Works—16-page illustrated bulletin entitled "Contract Production Facilities at Searles" shows typical welded fabricated shapes and parts produced by company. Welding technique employed and available equipment for contract production are described.

40. Hydraulic Pump

Sundstrand Pump Div., Sundstrand Machine Tool Co.—4-page illustrated bulletin, form No. 125, describes hydraulic pumping unit for both low pressure large volume and high pressure small volume. Principle of Roto-Roll pump, description, dimensions, specifications and typical applications are covered.

41. Tangent Bender

Struthers Wells Corp.—16-page illustrated bulletin describes Single Wing, Double Wing and newly developed Stretch Wing tangent bender machines. Engineering information, special features of machines and product shapes and designs that can be formed in single operation are included. Silent and automatic, machines are used for bending sheet metal.

42. Toolroom Furnaces

Lindberg Engineering Co.—4-page illustrated bulletin No. 160 presents details of line of gas-fired toolroom box type furnaces for tempering and heat treating operations utilizing temperatures from 250 to 1250 F. These furnaces are especially suited for tempering or preheating of tools, dies and other small parts.

43. Scales in Industry

Toledo Scale Co.—20-page illustrated brochure No. 1014 is entitled "Back-Ground for Victory". Details are presented on how company's research contributed to mass production by industry of the materials and weapons of Victory. Applications of scales in war plants, process industries and other fields are shown.

STEEL
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11-12-45

1	11	21	31	41
2	12	22	32	42
3	13	23	33	43
4	14	24	34	44
5	15	25	35	45
6	16	26	36	46
7	17	27	37	47
8	18	28	38	48
9	19	29	39	49
10	20	30	40	50

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COMPANY

PRODUCTS MANUFACTURED

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STEEL
Penton Building
CLEVELAND 13, OHIO

Readers' Service Dept.

Mills Schedule Closely To Spread Steel Equitably

Quotas more general as demand overflows . . .
Orders screened to give best distribution . . .
Production shows further gain

ALTHOUGH steel demand is overwhelming, producers are making headway in setting up orderly schedules, mainly by restricting tonnage accepted, through establishment of quotas or use of other selective measures.

Some mills are virtually out of the market on the theory that it is better to digest what they have than to make delivery promises with little assurance they can be kept. As a partial result mill backlogs are not as heavy as during the war. One large producer of diversified products estimates backlogs at four months on the basis of theoretical 100 per cent operation, against six months at the war peak. Also contributing to this situation is the lighter character of tonnage, reflecting the shift in emphasis from heavy ordnance and ship work to lighter civilian needs.

Another factor having influence is restraint on the part of some buyers, as a result of the unsettled labor outlook, most noticeable in building construction, which draws considerably on heavier steel products. Here it is not only the labor situation, with its bearing on costs and deliveries, but shortage of draftsmen and estimators. Much more construction business is coming out than can be figured.

In spite of progress in setting up orderly schedules much remains to be done, consumer pressure for steel is being stimulated by a possible early increase in prices. Demand for steel is noted from practically all sides and employment of selective measures in many cases is difficult. Various mills, where they found nothing else could be done, as in light flat-rolled products in particular, started establishment of quotas rather late, making the task especially hard. Others, who are picking and choosing, although still trying to extend some help to as many buyers as possible, have trouble keeping schedules from becoming too much extended.

Some producers of sheets and strip, who have been restricting scheduling for next year to first quarter only, are limiting it even further, setting it up on a monthly basis wherever possible. There also is greater disposition to set up sheet specialties, such as electrical sheets on a quota basis and there is possibility this may be extended to polished stainless sheets. Some producers already are booked into June on polished material and the likelihood is that if quotas are established they will be made effective for second half, as has been done in at least one or two cases in narrow hot strip.

Steelmaking operations continue the climb from the low point reached during the coal strike, the estimated national rate for last week being 76 per cent of capacity, a gain of three points from the prior week. Chicago made the largest gain, 8½ points to 82 per cent, with Pittsburgh gaining 2½ points to 75 per cent. Buffalo advanced 4½ points to 86, Youngstown 1 point to 55, Cincinnati 6 points to 77 and New England 2 points to 82 per cent. Wheeling receded 1½ points to 85 and Cleveland 2 points to 81. Rates were unchanged as follows: St. Louis 68, eastern Pennsylvania 74, Birmingham 95 and Detroit 88.

While no distress has resulted from lack of scrap, supply is tight and melters are seeking tonnage eagerly, in part to provide reserves for winter. Steelmakers are taking premium grades for open-hearth melting and are paying additional freight equalization for remote scrap. Industrial scrap is in short supply, as is material made available from war contract settlements.

Railroad buying is increasing, the outstanding purchase last week being 156,000 tons of steel rails for 1946 delivery, by the Pennsylvania railroad, distributed among three producers. Later purchase will cover approximately 50,000 tons of accessories.

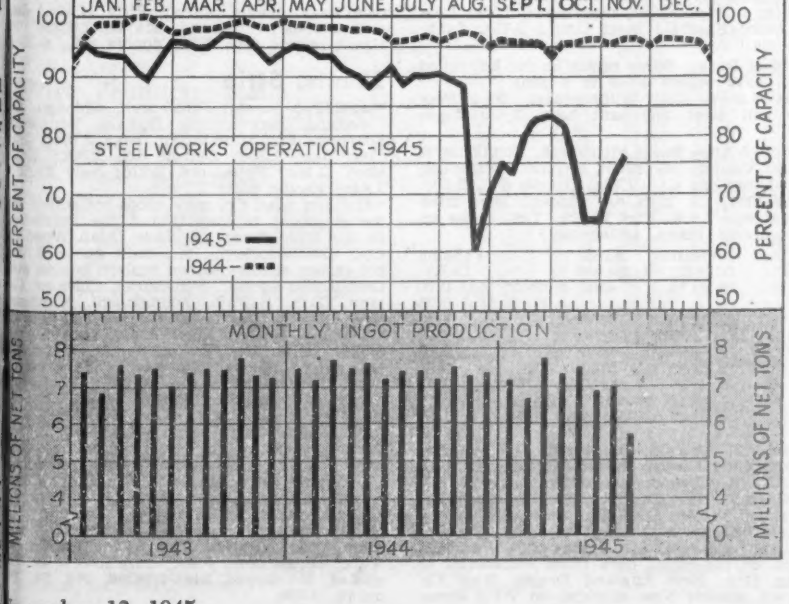
With ceiling prices maintained, average composite prices of steel and iron products are unchanged, finished steel composite being $58.27, semifinished steel $37.80, steelmaking pig iron $24.80 and steelmaking scrap $19.17.

DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended Nov. 10	Change	Same Week 1944	Same Week 1943
Pittsburgh	75	+2.5	91.5	99
Chicago	82	+8.5	100.5	101.5
Eastern Pa.	74	None	95.5	95
Youngstown	55	+1	88	95
Wheeling	85	—1.5	91	99
Cleveland	81	—2	93	94.5
Buffalo	86	+4.5	90.5	70
Birmingham	95	None	90	84
New England	82	+2	88	95
Cincinnati	77	+6	87	91
St. Louis	68	None	75	93
Detroit	88	None	87	94
Estimated national rate	76	+3	96.5	99

[a] Based on steelmaking capacities as of these dates.



COMPOSITE MARKET AVERAGES

	Nov. 10	Nov. 3	Oct. 27	One Month Ago Oct., 1945	Three Months Ago Aug., 1945	One Year Ago Nov., 1944	Five Years A Nov., 19
Finished Steel	$58.27	$58.27	$58.27	$58.27	$58.27	$56.73	$56.73
Semifinished Steel	37.80	37.80	37.80	37.80	37.80	36.00	36.00
Steelmaking Pig Iron	24.80	24.80	24.80	24.25	24.05	23.05	22.05
Steelmaking Scrap	19.17	19.17	19.17	19.17	19.17	16.40	20.80

Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite: Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago. Cleveland, Neville Island, Granite City and Youngstown. Steelwo Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; oth gross tons.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for last Month, Three Months and One Year Ago

Finished Material	Nov. 10, 1945	Oct., 1945	Aug., 1945	Nov., 1944
Steel bars, Pittsburgh	2.25c	2.25c	2.25c	2.15c
Steel bars, Philadelphia	2.57	2.57	2.57	2.47
Steel bars, Chicago	2.25	2.25	2.25	2.15
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.215	2.215	2.215
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.25	2.25	2.25	2.10
Plates, Philadelphia	2.30	2.30	2.30	2.15
Plates, Chicago	2.25	2.25	2.25	2.10
Sheets, hot-rolled, Pittsburgh	2.20	2.20	2.20	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.70	3.70	3.70	3.50
Sheets, hot-rolled, Gary	2.20	2.20	2.20	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Gary	3.70	3.70	3.70	3.50
Bright bess., basic wire, Pittsburgh	2.75	2.75	2.75	2.60
Tin plate, per base box, Pittsburgh	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.90	2.90	2.90	2.55

Semifinished Material				
Sheet bars, Pittsburgh, Chicago	$36.00	$36.00	$36.00	$34.00
Slabs, Pittsburgh, Chicago	36.00	36.00	36.00	34.00
Rerolling billets, Pittsburgh	36.00	36.00	36.00	34.00
Wire rods, No. 5 to ⅜-inch, Pitts.	2.15	2.15	2.15	2.00

Pig Iron	Nov. 10. 1945	Oct., 1945	Aug., 1945	No 19
Bessemer, del. Pittsburgh	$26.94	$26.35	$26.19	$25.
Basic, Valley	25.25	24.65	24.50	23.
Basic, eastern del. Philadelphia	27.09	26.53	26.34	25.
No. 2 fdry., del. Pitts., N.&S. Sides	26.44	25.85	25.69	24.
No. 2 foundry, Chicago	25.75	25.15	25.00	24.
Southern No. 2, Birmingham	22.13	21.57	21.38	20.
Southern No. 2 del. Cincinnati	26.05	25.50	25.30	24.
No. 2 fdry., del. Philadelphia	27.59	27.03	26.84	25.
Malleable, Valley	25.75	25.15	25.00	24.
Malleable, Chicago	25.75	25.15	25.00	24.
Lake Sup., charcoal del. Chicago	37.34	37.34	37.34	37.
Gray forge, del. Pittsburgh	25.94	25.35	25.19	24.
Ferromanganese, del. Pittsburgh	140.00	140.26	140.33	140.

Scrap				
Heavy melting steel, No. 1 Pittsburgh	$20.00	$20.00	$20.00	$17.
Heavy melt. steel, No. 2, E. Pa.	18.75	18.75	18.45	15.
Heavy melting steel, Chicago	18.75	18.75	18.75	17.
Rails for rolling, Chicago	22.25	22.25	22.25	22.
No. 1 cast, Chicago	20.00	20.00	20.00	20.

Coke				
Connellsville, furnace, ovens	$7.50	$7.50	$7.50	$7.
Connellsville, foundry ovens	8.25	8.25	8.25	7.
Chicago, by-product fdry., del.	13.35	13.75	13.75	13.

STEEL, IRON RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA Schedule No. 6 issued April 16, 1941, revised June 20, 1941, Feb. 4, 1942 and May 1945. The schedule covers all iron or steel ingots, all semifinished iron or steel products, all finished hot-rolled, cold-rolled iron or steel produ and any iron or steel product which is further finished by galvanizing, plating, coating, drawing, extruding, etc., although only principal est lished basing points for selected products are named specifically. Seconds and off-grade products are also covered. Exceptions applying to individ companies are noted in the table. Finished steel quoted in cents per pound.

Semifinished Steel

Gross ton basis except wire rods, skelp.

Carbon Steel Ingots: F.o.b. mill base, rerolling qual., stand. analysis, $31.00.
(Empire Sheet & Tin Plate Co., Mansfield, O. may quote carbon steel ingots at $33 gross ton, f.o.b. mill Kaiser Co. Inc., $43, f.o.b. Pacific ports.)

Alloy Steel Ingots: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon; uncrop, $45.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $36; Detroit, del. $38; Duluth (bll) $38; Pac. Ports, (bll) $48. (Andrews Steel Co., carbon slabs $41; Continental Steel Corp., billets $34, Kokomo, to Acme Steel Co.; Northwestern Steel & Wire Co., $41, Sterling, Ill; Laclede Steel Co., $34 Alton or Madison, Ill.; Wheeling Steel Corp. $36 base, billets for lend-lease, $34, Portsmouth, O., on slabs on WPB directives. Granite City Steel Co. $47.50 gross ton slabs from D.P.C. mill. Geneva Steel Co., Kaiser Co. Inc., $58.64, Pac. ports.)

Forging Quality Blooms, Slabs, Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $42. Detroit, del. $44; Duluth, billets, $44; forg. bil. f.o.b. Pac. ports, $54.
(Andrews Steel Co. may quote carbon forging billets $50 gross ton at established basing points; Follansbee Steel Corp., $49.50 f.o.b. Toronto, O. Geneva Steel Co., Kaiser Co. Inc., $64.64, Pacific ports.)

Open Hearth Shell Steel: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Youngstown, Birmingham, base 1000 tons one size and section; 3-12 in., $52; 12-18 in., excl., $54.00; 18-in. and over $56. Add $2.00 del. Detroit; $3.00 del. Eastern Mich. (Kaiser Co. Inc., $76.64, f.o.b. Los Angeles.)

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $54, del. Detroit $56, Eastern Mich. $57.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $36. (Wheeling Steel Corp. $37 on lend-lease sheet bars, $38 Portsmouth, O., on WPB directives; Empire Sheet & Tin Plate Co., Mansfield, O., carbon sheet bars, $39, f.o.b. mill.)

Skelp: Pittsburgh, Chicago, Sparrows Point, Youngstown, Coatesville, lb., 1.90c.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, 5—⅝ in. inclusive, per 100 lbs., $2.15 Do., over ⅝—47/64-in., incl., $2.30; Galveston, base, 2.25c and 2.40c, respectively. Worcester add $0.10; Pacific ports $0.50 (Pittsburgh Steel Co., $0.20 higher.)

Bars

Hot-Rolled Carbon Bars and Bar-Size Shapes under 3: Pittsburgh, Youngstown, Chicago, Gary, Cleveland, Buffalo, Birmingham base 20 tons one size, 2.25c; Duluth, base 2.35c; Detroit, del. 2.35c; Eastern Mich. 2.40c; New York del. 2.59c; Phila. del. 2.57c; Gulf Ports, dock 2.62c; Pac. ports, dock 2.90c, (Calumet Steel Division, Borg-Warner Corp., and Joslyn Mfg. & Supply Co., may quote 2.55c, Chicago base; Sheffield Steel Corp., 2.75c, f.o.b. St. Louis.)

Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons.
(Sweet's Steel Co., Williamsport, Pa., may quote rail steel merchant bars 2.35c f.o.b. mill.)

Hot-Rolled Alloy Bars: Pittsburgh, Youngstown, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.70c; Detroit del., 2.80c. (Texas Steel Co. may use Chicago base price as maximum f.o.b. Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

AISI Series	(*Basic O-H)	AISI Series	(*Basic O-H)
1300	$0.10	4100 (.15-.25 Mo)	0.70
		4100 (.20-.30 Mo)	0.75
2300	1.70	4300	1.70
2500	2.55	4600	1.20
3000	0.50	4800	2.15
3100	0.85	5100	0.35
3200	1.35	5130 or 5152	0.45
3400	3.20	6120 or 6152	0.95
4000	0.45-0.55	6145 or 6150	1.20

*Add 0.25 for acid open-hearth; 0.50 electric.

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs., 2.75c; Detroit 2.80c; Toledo 2.90c. (Keystone Drawn Steel Co. may sell outside its usual market area on Proc. Div., Treasury Dept. contracts at 2.65c, Spring City, Pa., plus freight on hot-rolled bars from Pittsburgh to Spring City, New England Drawn Steel Co. may sell outside New England on WPB directives at 2.65c, Mansfield, Mass., plus freight on hot-rolled bars from Buffalo to Mansfield.)

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 3.35c; Detroit del. 3.45c; Eastern Mich. 3.50c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base 2.1 Detroit del. 2.25c; Eastern Mich. and Toledo 2.30c; Gulf ports, dock 2.50c; Pacific ports dock 2.55c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo base 2.15c; Detroit, del. 2.2 Eastern Mich. and Toledo 2.30c; Gulf ports dock 2.50c.

Iron Bars: Single refined, Pitts. 4.40c; double refined 5.40c; Pittsburgh, staybolt, 5.75c; Terre Haute, single ref., 5.00, double ref., 6.25c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base 2.20c; Granite City, base 2.30c; Detroit del. 2.30c; Eastern Mich. 2.35c; Phila. del. 2.37c; New York del. 2.44c; Pacific ports 2.75c.
(Andrews Steel Co. may quote hot-rolled sheets for shipment to Detroit and the Detroit area on the Middletown, O., base; Alan Wood Steel Co., Conshohocken, Pa., may quote 2.35c on hot carbon sheets, nearest eastern basing point.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.05c; Granite City, base 3.15c; Detroit del. 3.15c; Eastern Mich. 3.20c; New York 3.39c; Phila. del. 3.37c; Pacific ports 3.

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.70c; Granite City, base 3.80c; New York del. 3.9 Phila. del. 3.78c; Pacific ports 4.25c.
(Andrews Steel Co. may quote galvanized sheets 3.75c at established basing points.)

Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29 gage, per square 3.

Culvert Sheets: Pittsburgh, Chicago, Birmingham, 16 gage not corrugated, copper alloy 3.60c; Granite City 3.70c; Pacific ports 4.25c; copper iron, 3.90c; pure iron 3.95c; zinc coated, hot-dipped, heat-treated, No. 24, Pittsburgh, 4.25c.

Enameling Sheets: 10-gage: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base 2.85c; Granite City, base 2.95c; Detroit, del. 2.95c; eastern, Mich. 3.00c; Pacific ports 3.50c; 20-gage; Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base 3.45c; Detroit del. 3.55c; eastern Mich. 3.60c; Pacific ports 4.10c.

Electrical Sheets No. 24:

	Pittsburgh Base	Pacific Ports	Granite City
Field grade	3.30c	4.05c	3.30c
Armature	3.65c	4.40c	3.75c
Electrical	4.15c	4.90c	4.25c
Motor	5.05c	5.80c	5.15c
Dynamo	5.75c	6.50c	5.85c
Transformer			
72	6.25c	7.00c	....
65	7.25c	8.00c	....
58	7.75c	8.50c	....
52	8.55c	9.30c	....

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base 1 ton and over, 12 inches wide and less 2.10c; Detroit del. 2.20c; Eastern Mich. 2.25c; Pacific ports 2.75c

Cold Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c; Chicago, base 2.90c; Detroit, del. 2.90c; Eastern Mich. 2.95c; Worcester base 3.00c.

Commodity C. R. Strip: Pittsburgh, Cleveland Youngstown, base 3 tons and over, 2.95c; Chicago 3.05c; Detroit del. 3.05c; Eastern Mich. 3.10c; Worcester base 3.25c.

Cold Finished Spring Steel: Pittsburgh, Cleveland bases, add 20c for Worcester; .26-.50 Carb., 2.80c; .51-.75 Carb., 4.30c; .76-1.00 Carb., 6.15c; over 1.00 Carb., 8.35c.

Tin, Terne Plate

Tin Plate: Pittsburgh, Chicago, Gary, 100-lb. base box, $5.00; Granite City $5.10.

Electrolytic Tin Plate: Pittsburgh, Gary, 100-lb. base box, 0.25 lb. tin, $4.35; 0.50 lb. tin, $4.50; 0.75 lb. tin $4.65; Granite City, $4.45, $4.60, $4.75, respectively

Tin Mill Black Plate: Pittsburgh, Chicago, Gary, base 29 gage and lighter, 3.05c; Granite City, 3.15c; Pacific ports, boxed, 4.05c.

Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted 3.80c; Pacific ports 4.55c.

Manufacturing Ternes: (Special Coated) Pittsburgh, Chicago, Gary, 100-base box $4.30; Granite City $4.40.

Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I.C. 8-lb. $12.00; 15-lb. $14.00; 20-lb. $15.00; 25-lb. $16; 30-lb. $17.25; 40-lb. $19.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.25c; New York, del. 2.44c; Phila., del. 2.30c; St. Louis, 2.49c; Boston, del. 2.57-82c; Pacific ports, 2.80c; Gulf ports, 2.60c.

(Granite City Steel Co. may quote carbon plates 2.35c f.o.b. mill; 2.65c f.o.b. D.P.C. mill; Kaiser Co. Inc., 3.20c, f.o.b. Los Angeles. Central Iron & Steel Co. 2.50c f.o.b. basing points; Geneva Steel Co., Provo, Utah, 3.20c, f.o.b. Pac. ports.)

Floor Plates: Pittsburgh, Chicago, 3.50c; Pacific ports, 4.15c; Gulf ports, 3.85c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.50c; Gulf ports 3.95c; Pacific ports 4.15c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.10c; New York, del. 2.27c; Phila., del. 2.215c; Pacific ports, 2.75c; Gulf ports, 2.45c.

Piling

Pittsburgh, Chicago, Buffalo 2.40; Pacific ports, 2.95c.

Wire Products, Nails

Wire: Pittsburgh, Chicago, Cleveland, Birmingham to manufacturers in carloads.

Bright basic, bessemer wire *2.75c
Spring wire ..... *†3.35c

Wire Products to the Trade:

Standard and cement-coated wire nails, and staples, 100-lb. keg, Pittsburgh, Chicago, Birmingham, Cleveland, $2.90; Pac. ports, $3.40; galvanized, $2.55 and $3.05, resp.

Annealed Merchant quality wire, 100-lb., Pittsburgh, Chicago, Cleveland, Birmingham ..... ††$3.20

Galvanized Merchant quality wire, 100-lb., Pittsburgh, Chicago, Cleveland, Birmingham ..... ††$3.55

Woven fence, 15½ gage and heavier, per base column 67

Barbed wire, 80-rod spool, Pittsburgh, Chicago, Cleveland, Birmingham, column 72; twisted barbless wire, column 72.

*Pittsburgh Steel Co., 0.20c higher; add 2 cents for Worcester, 1 cent for Duluth; add ½-cent for bright, annealed or galvanized and 7/10-cent for other finishes for Pacific ports.

†Same bases as for bright basic except Birmingham.

††Add 10 cents for Worcester; 50 cents for annealed, bright basic and 70 cents for all other finishes for Pacific ports.

Tubular Goods

Welded Pipe: Base price in carloads, threaded and coupled to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind. 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

Butt Weld

Steel In.	Blk.	Galv.	Iron In.	Blk.	Galv.
⅛	56	33	¼	24	3½
¼ & ⅜	59	40½	⅜	30	10
½	63½	51	½-1¼	34	16
¾	66½	55	1½	38	18½
1-3	68½	57½	2	37½	18

Lap Weld

Steel In.	Blk.	Galv.	Iron In.	Blk.	Galv.
2	61	49½	1¼	23	3½
2½-3	64	54½	1½	28½	10
3½-6	66	54½	2	30½	12
7-8	65	52½	2½-3½	31½	14½
9-10	64½	52	4	33½	18
11-12	63½	51	4½-8	32½	17
			9-12	28½	12

Boiler Tubes: Net base prices per 100 feet f.o.b. Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O.D Sizes	B.W.G	—Seamless— Hot Rolled	Cold Drawn	—Lap Weld— Steel	Charcoal Iron
1"	13	$ 7.82	$ 9.01	.....	.....
1¼"	13	9.26	10.67	.....	.....
1½"	13	10.23	11.72	$ 9.72	$23.71
1¾"	13	11.64	13.42	11.06	22.93
2"	13	13.04	15.03	12.38	19.35
2¼"	13	14.54	16.76	13.79	21.63
2½"	12	16.01	18.45	15.16	.....
2¾"	12	17.54	20.21	16.58	26.57
3"	12	18.59	21.42	17.54	29.00
3½"	12	19.50	22.48	18.35	31.38
3½"	11	24.63	28.37	23.15	39.81
4"	10	30.54	35.20	28.66	49.90
4½"	10	37.35	43.04	35.22	.....
5"	9	46.87	54.01	44.25	73.93
6"	7	71.96	82.93	68.14	.....

Rails, Supplies

Standard rails, over 60-lb., f.o.b. mill, gross ton, $43.00. Light rails (billet), Pittsburgh, Chicago, Birmingham, gross ton, $45.00.

*Relaying rails, 35 lbs. and over, f.o.b. railroad and basing points, $31-$33.

Supplies: Track bolts, 4.75c; heat treated, 5.00c. Tie plates $46 net ton, base, Standard spikes, 3.25c.

*Fixed by OPA Schedule No. 46, Dec. 15, 1941.

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., base, cents per lb.; Reg. carbon 14.00c; extra carbon 18.00c; special carbon 22.00c; oil-hardening 24.00c; high car.-chr. 43.00c.

Tung	Chr.	Van.	Moly.	Base, per lb.
18.00	4	1	...	67.00c
1.5	4	1	8.5	54.00c
.....	4	2	8	54.00c
6.40	4.15	1.90	5	57.50c
5.50	4.50	4	4.50	70.00c

Stainless Steels

Base, Cents per lb.

Type	Bars	Plates	Sheets	H. R. Strip	C. R. Strip
CHROMIUM NICKEL STEEL					
302	24.00c	27.00c	34.00c	21.50c	28.00c
303	26.00	29.00	36.00	27.00	33.00
304	25.00	29.00	36.00	23.50	30.00
308	29.00	34.00	41.00	28.50	35.00
309	36.00	40.00	47.00	37.00	47.00
310	49.00	52.00	53.00	48.75	56.00
312	36.00	40.00	49.00	.....	.....
*316	40.00	44.00	48.00	40.00	48.00
†321	29.00	34.00	41.00	29.25	38.00
‡347	33.00	38.00	45.00	33.00	42.00
431	19.00	22.00	29.00	17.50	22.50
STRAIGHT CHROMIUM STEEL					
403	21.50	24.50	29.50	21.25	27.00
**410	18.50	21.50	26.50	17.00	22.00
416	19.00	22.00	27.00	18.25	23.50
††420	24.00	28.50	33.50	23.75	36.50
430	19.00	22.00	29.00	17.50	22.50
††430F	19.50	22.50	29.50	18.75	24.50
440A	24.00	28.50	33.50	23.75	36.50
442	22.50	25.50	32.50	24.00	32.00
443	22.50	25.50	32.50	24.00	32.00
446	27.50	30.50	36.50	35.00	52.00
501	8.00	12.00	15.75	12.00	17.00
502	9.00	13.00	16.75	13.00	18.00
STAINLESS CLAD STEEL (20%)					
304	.....	‡‡18.00	19.00	.....	.....

*With 2-3% moly. ‡With titanium. †With columbium. **Plus machining agent. ††High carbon. ‡‡Free machining. §§Includes annealing and pickling.

Rivets, Washers

F.o.b. Pittsburgh, Cleveland, Chicago Birmingham

Structural 3.75c

⅞- inch and under ..... 65-5 off

Wrought, Washers, Pittsburgh, Chicago, Philadelphia, to jobbers and large nut, bolt manufacturers l.c.l. ..... $2.75-3.00 off

Bolts, Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%

Carriage and Machine

½ x 6 and smaller ..... 65½ off
Do., ⅞ and ⅝ x 6-in. and shorter .. 63½ off
Do., ⅝ to 1 x 6-in. and shorter ..... 61 off
1⅛ and larger, all lengths ..... 59 off
All diameters, over 6-in. long ..... 59 off
Tire bolts ..... 50 off
Step bolts ..... 58 off
Plow bolts ..... 65 off

Stove Bolts

In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Nuts

Semifinished hex	U.S.S.	S.A.E.
⅞-inch and less	62	64
1-1-inch	59	60
1⅛-1½-inch	57	58
1⅝ and larger	56	..

Hexagon Cap Screws

Upset 1-in., smaller ..... 64 off
Milled 1-in., smaller ..... 60 off

Square Head Set Screws

Upset, 1-in., smaller ..... 71 off
Headless, ¼-in., larger ..... 60 off
No. 10, smaller ..... 70 off

Basing Point Prices are (1) those announced by U. S. Steel Corp. subsidiaries for first quarter of 1941 or in effect April 16, 1941 at designated basing points or (2) those prices announced or customarily quoted by other producers at the same designated points. Base prices under (2) cannot exceed those under (1) except to the extent prevailing in third quarter of 1940.

Extra mean additions or deductions from base prices in effect April 16, 1941.

Delivered prices applying to Detroit, Eastern Michigan, Gulf and Pacific Coast points are deemed basing points except in the case of the latter two areas when water transportation is not available, in which case nearest basing point price plus all-rail freight may be charged.

Domestic Ceiling prices are the aggregate of (1) governing basing point price, (2) extras and (3) transportation charges to the point of delivery as customarily computed. Governing basing point is basing point nearest the consumer providing the lowest delivered price.

Seconds, maximum prices: flat-rolled rejects 75% of prime prices, wasters 75%, waste-wasters 65% except plates, which take waster prices; tin plate $2.80 per 100 lbs.; terne plate $2.25; semifinished 85% of primes; other grades limited to new material ceilings.

Export ceiling prices may be either the aggregate of (1) governing basing point or emergency basing point (2) export extras (3) export transportation charges provided they are the f.a.s. seaboard quotations of the U. S. Steel Export Co. on April 16, 1941.

Metallurgical Coke

Price Per Net Ton

Beehive Ovens

Connellsville, furnace	*7.50
Connellsville, foundry	8.00- 8.50
New River, foundry	9.00- 9.25
Wise county, foundry	7.75- 8.25
Wise county, furnace	7.25- 7.75

By-Product Foundry

Kearney, N. J., ovens	13.65
Chicago, outside delivered	13.00
Chicago, delivered	13.75
Terre Haute, delivered	13.50
Milwaukee, ovens	13.75
New England, delivered	14.65
St. Louis, delivered	†13.75
Birmingham, delivered	10.90
Indianapolis, delivered	13.50
Cincinnati, delivered	13.25
Cleveland, delivered	13.20
Buffalo, delivered	13.40
Detroit, delivered	13.75
Philadelphia, delivered	13.20

*Operators of hand-drawn ovens using trucked coal may charge $8.00; effective May 26, 1945.

†14.25 from other than Ala., Mo., Tenn.

Coke By-Products

Spot, gal., freight allowed east of Omaha	
Pure and 90% benzol	15.00c
Toluol, two degree	28.00c
Solvent naphtha	27.00c
Industrial xylol	27.00c
Per lb. f.o.b. works	
Phenol (car lots, returnable drums)	13.50c
Do., less than car lots	14.25c
Do., tank cars	11.50c
Eastern Plants, per lb.	
Naphthalene flakes, balls, bbls., to jobbers	5.00c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$28.20

WAREHOUSE STEEL PRICES

Base delivered price, cents per pound, for delivery within switching limits, subject to established extras.

	Hot rolled bars	Structural shapes	Plates	Floor plates	Hot rolled sheets (10 gage base)	Hot rolled bands (12 gage and heavier)	Hot rolled hoops (14 gage and lighter)	Galvanized flat sheets (24 gage base)	Cold-rolled sheets (17 gage base)	Cold finished bars	Cold-rolled strip	NE hot bars 8600 series	NE hot bars 9400 series
Boston	4.044[1]	3.912[1]	3.912[1]	5.727[1]	3.774[1]	4.106[1]	5.106[1]	5.224[14]	4.744[14]	4.244[21]	4.715	6.012[20]	6.012[20]
New York	3.853[1]	3.758[1]	3.768[1]	5.574[1]	3.590[1]	3.974[1]	3.974[1]	5.010[13]	4.613[14]	4.203[21]	4.774	.....	.....
Jersey City	3.853[1]	3.747[1]	3.768[1]	5.574[1]	3.590[1]	3.974[1]	3.974[1]	5.010[13]	4.613[14]	4.203[21]	4.774	.....	.....
Philadelphia	3.822[1]	3.666[2]	3.605[1]	5.272[1]	3.518[1]	3.922[1]	4.272[1]	5.018[13]	4.872[28]	4.172[21]	4.772	5.816[20]	5.860[20]
Baltimore	3.802[1]	3.759[1]	3.594[1]	5.252[1]	3.394[1]	3.902[1]	4.252[1]	4.894[1]	4.852[28]	4.152[21]	.....	.....	.....
Washington	3.941[1]	3.930[1]	3.796[1]	5.341[1]	3.596[1]	4.041[1]	4.391[1]	5.196[17]	4.841[30]	4.141[21]	.....	.....	.....
Norfolk, Va.	4.065[1]	4.002[1]	3.971[1]	5.465[1]	3.771[1]	4.165[1]	4.515[1]	5.371[17]	4.965[34]	4.265[21]	.....	.....	.....
Bethlehem, Pa.*	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Claymont, Del*	.....	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Coatesville, Pa.*	.....	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Buffalo (city)	3.35[1]	3.40[1]	3.63[1]	5.26[1]	3.35[1]	3.819[1]	3.819[1]	4.75[15]	4.40[10]	3.85[21]	4.669	5.60[33]	5.75[33]
Buffalo (country)	3.25[1]	3.30[1]	3.30[1]	4.90[1]	3.25[1]	3.81[1]	3.50[1]	4.65[15]	4.30[10]	3.75[21]	4.35	5.60[33]	5.75[33]
Pittsburgh (city)	3.35[1]	3.40[1]	3.40[1]	5.00[1]	3.35[1]	3.60[1]	3.60[1]	4.75[13]	4.40[34]	3.85[21]	.....	.....	.....
Pittsburgh (country)	3.25[1]	3.30[1]	3.30[1]	4.90[1]	3.25[1]	3.50[1]	3.50[1]	4.65[13]	4.30[34]	3.75[21]	.....	.....	.....
Cleveland (city)	3.35[1]	3.588[1]	3.40[1]	5.188[1]	3.35[1]	3.60[1]	3.60[1]	4.877[13]	4.40[34]	3.85[21]	4.45[21]	5.60[33]	5.65[33]
Cleveland (country)	3.25[1]	.....	3.30[1]	.....	3.25[1]	3.50[1]	3.50[1]	.....	4.30[34]	3.75[21]	4.35[21]	.....	.....
Detroit	3.450[1]	3.661[1]	3.609[1]	5.281[1]	3.450[1]	3.700[1]	3.700[1]	5.000[12]	4.500[34]	3.900[21]	4.659	5.93[33]	5.93[33]
Omaha (city, delivered)	4.115[1]	4.165[1]	4.165[1]	5.765[1]	3.865[1]	4.215[1]	4.215[1]	5.608[19]	5.443[34]	4.543[12]	.....	.....	.....
Omaha (country, base)	4.015[1]	4.065[1]	4.065[1]	5.665[1]	3.765[1]	4.115[1]	4.115[1]	5.508[19]	.....	.....	.....	.....	.....
Cincinnati	3.611[2]	3.691[1]	3.661[1]	5.291[1]	3.425[1]	3.675[1]	3.675[1]	4.825[13]	4.475[34]	4.111[21]	4.711	6.10	6.20
Youngstown, O.*	.....	.....	.....	.....	.....	.....	.....	4.40[13]	.....	.....	.....	.....	.....
Middletown, O.*	.....	.....	.....	.....	3.25[1]	3.50[1]	3.50[1]	4.65[16]	.....	.....	.....	.....	.....
Chicago (city)	3.50[1]	3.55[1]	3.55[1]	5.15[1]	3.25[1]	3.60[1]	3.60[1]	5.231[13]	4.20[34]	3.85[21]	4.65	5.75[33]	5.85[33]
Milwaukee	3.637[1]	3.687[1]	3.687[1]	5.287[1]	3.387[1]	3.737[1]	3.737[1]	5.272[13]	4.337[34]	3.987[21]	4.787	5.987[33]	6.087[33]
Indianapolis	3.58[1]	3.63[1]	3.63[1]	5.23[1]	3.518[1]	3.768[1]	3.768[1]	4.918[13]	4.568[34]	4.08[21]	4.78	6.08[33]	6.18[33]
St. Paul	3.76[2]	3.81[2]	3.81[2]	5.41[2]	3.51[2]	3.86[2]	3.86[2]	5.257[15]	4.46[34]	4.461[21]	5.102	6.09[33]	6.19[33]
St. Louis	3.647[1]	3.697[1]	3.697[1]	5.297[1]	3.397[1]	3.747[1]	3.747[13]	5.172[15]	4.347[31]	4.131[21]	4.931	6.131[33]	6.231[33]
Memphis, Tenn.	4.015[5]	4.065[5]	4.065[5]	5.78[5]	3.965[5]	4.215[5]	4.215[5]	5.265[15]	4.78[34]	4.49[21]	.....	.....	.....
Birmingham	3.50[1]	3.55[1]	3.55[1]	5.903[1]	3.45[1]	3.70[1]	3.70[1]	4.75[15]	4.852[34]	4.64	5.215	.....	.....
New Orleans (city)	4.10[4]	3.90[4]	3.90[4]	5.85[4]	4.058[4]	4.20[4]	4.20[4]	5.25[20]	5.079[10]	4.70[21]	5.429	.....	.....
Houston, Tex.	3.75[3]	4.25[3]	4.25[3]	5.50[3]	3.763[3]	4.313[3]	4.313[3]	5.313[20]	4.10[10]	3.75[22]	.....	.....	.....
Los Angeles	4.40[1]	4.65[4]	4.95[4]	7.20[4]	5.60[4]	4.95[4]	6.75[4]	6 00[13]	7.20[6]	5.683[32]	5.613	5.85[33]	5.95[33]
San Francisco	4.15[7]	4.35[7]	4.65[7]	6.35[7]	4.55[7]	4.50[7]	5.75[7]	6.35[15]	7.30[15]	5.433[21]	7.383	8.304[20]	8.404[20]
Portland, Oreg.	4.45[27]	4.45[27]	4.75[27]	6.50[27]	4.65[27]	4.75[27]	6.30[27]	5.75[15]	6.60[15]	5.633[15]	.....	.....	.....
Tacoma	4.35[8]	4.45[8]	4.75[8]	6.50[8]	4.65[8]	4.25[8]	5.45[8]	5.95[15]	7.60[15]	5.883[21]	.....	.....	8.00[33]
Seattle	4.35[8]	4.45[8]	4.75[8]	6.50[8]	4.65[8]	4.25[8]	5.45[8]	5.95[15]	7.05[15]	5.883[21]	.....	.....	8.00[33]

*Basing point cities with quotations representing mill prices, plus warehouse spread.
NOTE—All prices fixed by Office of Price Administration in Amendments Nos. 10 to 33 to Revised Price Schedule No. 49. Deliveries outside above cities computed in accordance with regulations.

BASE QUANTITIES

[1]400 to 1999 pounds; [2]—400 to 14,999 pounds; [3]—any quantity; [4]—300 to 1999 pounds; [5]—400 to 8999 pounds; [6]—300 to 9999 pounds; [7]—400 to 39,999 pounds; [8]—under 2000 pounds; [9]—under 4000 pounds; [10]—500 to 1499 pounds; [11]—one bundle to 39,999 pounds; [12]—150 to 2249 pounds; [13]—150 to 1499 pounds; [14]—three to 24 bundles, [15]—450 to 1499 pounds; [16]—one bundle to 1499 pounds; [17]—one to nine bundles; [18]—one to six bundles; [19]—100 to 749 pounds; [20]—300 to 1999 pounds; [21]—1500 to 39,999 pounds; [22]—1500 to 1999 pounds; [23]—1000 to 39,999 pounds; [24]—400 to 1499 pounds; [25]—1000 to 1999 pounds; [26]—under 25 bundles. Cold-rolled strip, 2000 to 39,999 pounds, base; [27]— 300 to 4999 pounds.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (Natural) Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56-63% contract	18.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% f.o.b. Rio de Janeiro	7.50-8.00

Tungsten Ore

Chinese Wolframaite, per short ton unit, duty paid	$24.00

Chrome Ore

(Equivalent OPA schedules):

Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Ore., or Tacoma, Wash.

(S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	$41.00
48% 3:1	43.50
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	$27.40
45% no ratio	28.30
48% no ratio	31.00
50% no ratio	32.80
Brazilian—nominal	
44% 2.5:1 lump	33.65
48% 3:1 lump	43.50
Rhodesian	
45% no ratio	28.30
48% no ratio	31.00
48% 3:1 lump	43.50
Domestic (seller's nearest rail)	
48% 3:1	52.80
less $7 freight allowance	

Manganese Ore

Sales prices of Metals Reserve Co., cents per gross ton unit, dry, 48%, at New York, Philadelphia, Baltimore, Norfolk, Mobile and New Orleans, 85.0c; Fontana, Calif., Provo, Utah, and Pueblo, Colo., 91.0c; prices include duty on imported ore and are subject to premiums, penalties and other provisions of amended M.P.R. No. 248, effective as of May 15. Price at basing points which are also points of discharge of imported manganese ore is f.o.b. cars, shipside, at dock most favorable to the buyer.

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

NATIONAL EMERGENCY STEELS (Hot Rolled)

(Extras for alloy content)

Basic open-hearth Electric furnace

Designation	Chemical Composition Limits, Per Cent — Carbon	Mn.	Si.	Cr.	Ni.	Mo.	Bars per 100 lb.	Billets per GT	Bars per 100 lb.	Billets per GT
NE 8612	.10-.15	.70-.90	.20-.35	.40-.60	.40-.70	.15-.25	$0.65	$13.00	$1.15	$23.00
NE 8720	.18-.23	.70-.90	.20-.35	.40-.60	.40-.70	.20-.30	.70	14.00	1.20	24.00
NE 9415	.13-.18	.80-1.10	.20-.35	.30-.50	.30-.60	.08-.15	.75	15.00	1.25	25.00
NE 9425	.23-.28	.80-1.20	.20-.35	.30-.50	.30-.60	.08-.15	.75	15.00	1.25	25.00
NE 9442	.40-.45	1.00-1.30	.20-.35	.30-.50	.30-.60	.08-.15	.80	16.00	1.30	26.00
NE 9722	.20-.25	.50-.80	.20-.35	.10-.25	.40-.70	.15-.25	.65	13.00	1.15	23.00
NE 9830	.28-.33	.70-.90	.20-.35	.70-.90	.85-1.15	.20-.30	1.30	26.00	1.80	36.00
NE 9912	.10-.15	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.20	24.00	1.55	31.00
NE 9920	.18-.23	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.20	24.00	1.55	31.00

Extras are in addition to a base price of 2.70c, per pound on finished products and $54 per gross ton on semifinished steel major basing points and are in cents per pound and dollars per gross ton. No prices quoted on vanadium alloy.

Pig Iron

Prices (in gross tons) are maximums fixed by OPA Price Schedule No. 10, effective June 10, 1941, amended Feb. 14, and Oct. 22, 1945. Exceptions indicated in footnotes. Base prices bold face, delivered light face. Federal tax on freight charges, effective Dec. 1, 1942, not included.

	Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$26.75	$26.25	$27.75	$27.25
Newark, N. J., del.	28.28	27.78	29.28	28.78
Brooklyn, N. Y., del.	29.25	.....	.....	29.75
Birdsboro, Pa., base	26.75	26.25	27.75	27.25
Birmingham, base	‡22.13	‡20.75	26.75	.....
Baltimore, del.	27.36	.....	.....	.....
Boston, del.	26.89	.....	.....	.....
Chicago, del.	25.97	.....	.....	.....
Cincinnati, del.	25.81	24.48	.....	.....
Cleveland, del.	25.87	24.99	.....	.....
Newark, N. J.	27.90	.....	.....	.....
Philadelphia, del.	27.21	26.71	.....	.....
St. Louis, del.	25.87	24.99	.....	.....
Buffalo, base	25.75	24.75	26.75	26.25
Boston, del.	27.25	26.75	28.25	27.75
Rochester, del.	27.28	.....	28.28	27.78
Syracuse, del.	27.83	.....	28.83	28.33
Chicago, base	25.75	25.25	26.25	25.75
Milwaukee, del.	26.85	26.35	27.35	26.85
Muskegon, Mich., del.	28.94	.....	.....	28.94
Cleveland, base	25.75	25.25	26.25	25.75
Akron, Canton, O., del.	27.14	26.64	27.64	27.14
Detroit, base	25.75	25.25	26.25	25.75
Saginaw, Mich., del.	28.06	27.56	28.56	28.06
Duluth, base	26.25	25.75	26.75	26.25
St. Paul, del.	28.38	27.88	28.88	28.38
Erie, Pa., base	25.75	25.25	26.75	26.25
Everett, Mass., base	26.75	26.25	27.75	27.25
Boston, del.	27.25	26.75	28.25	27.75
Granite City, Ill., base	25.75	25.25	26.25	25.75
St. Louis, del.	26.25	25.75	.....	26.25
Hamilton, O., base	25.75	25.25	.....	25.75
Cincinnati, del.	26.19	26.36	.....	26.86
Neville Island, Pa., base	25.75	25.25	26.25	25.75
§Pittsburgh, del. No. & So. sides	26.44	25.94	26.94	26.44
Provo, Utah, base	23.75	23.25	.....	.....
Sharpsville, Pa., base	25.75	25.25	26.25	25.75
Sparrows Point, base	26.75	26.25	.....	.....
Baltimore, del.	27.74	.....	.....	.....
Steelton, Pa., base	.....	26.25	.....	27.25
Swedeland, Pa., base	26.75	26.25	27.75	27.25
Philadelphia, del.	27.59	27.09	.....	28.09
Toledo, O., base	25.75	25.25	26.25	25.75
Youngstown, O., base	25.75	25.25	26.25	25.75
Mansfield, O., del.	27.69	27.19	28.19	27.69

Base grade, silicon 1.75-2.25%; add 50 cents for each additional 0.25% silicon, or portion thereof; deduct 50 cents for silicon below 1.75% on foundry iron. †For phosphorus 0.70% or over deduct 38 cents. §For McKees Rocks, Pa., add .55 to Neville Island base; Lawrenceville, Homestead, McKeesport, Ambridge, Monaco, Aliquippa, .84; Monessen, Monongahela City .97 (water); Oakmont, Verona 1.11; Brackenbridge 1.24.

Note: Add 50 cents per ton for each 0.50% manganese or portion thereof over 1.00%.

Nickel differentials: Under 0.50%, no extra; 0.50% to 0.74% incl., $2 per ton; for each additional 0.25% nickel, $1 per ton.

High Silicon, Silvery

6.00-6.50 per cent (base)	$31.25		
6.51-7.00	$32.25	9.01- 9.50	37.25
7.01-7.50	33.25	9.51-10.00	38.25
7.51-8.00	34.25	10.01-10.50	39.25
8.01-8.50	35.25	10.51-11.00	40.25
8.51-9.00	36.25	11.01-11.50	41.25

F.o.b. Jackson county, O., per gross ton, Buffalo base $1.25 higher, whichever is most favorable to buyer. Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

Electric Furnace Ferrosilicon: Sil. 14.01 to 14.50%, $45.50; each additional .50% silicon up to and including 18% add $1; low impurities not exceeding 0.05 Phos., 0.40 Sulphur, 1.0% Carbon, add $1.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton.

Charcoal Pig Iron

Northern

Lake Superior Furn. $34.00
Chicago, del. 37.34

Southern

Semi-cold blast, low phos., f.o.b. furnace, Lyles, Tenn. $33.00

(For higher silicon irons a differential over and above the price of base grades is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Gray Forge

Neville Island, Pa. $25.25
Valley base 25.25

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Buffalo, N. Y., $31.25 base; $32.49, del. Philadelphia. Intermediate phos., Central Furnace, Cleveland, $28.25.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differential: Basing point prices are subject to an additional charge not to exceed 50 cents a ton for each 0.25 silicon in excess of base grade (1.75 to 2.25%).

Phosphorus Differential: Basing point prices are subject to a reduction of 38 cents a ton for phosphorus content of 0.70% and over.

Ceiling Prices are the aggregate of (1) governing basing point (2) differentials (3) transportation charges from governing basing point to point of delivery as customarily computed. Governing basing point is the one resulting in the lowest delivered price for the consumer.

Exceptions to Ceiling Prices: Struthers Iron & Steel Co. may charge 50 cents a ton in excess of basing point prices for No. 2 Foundry, Basic, Bessemer and Malleable. Mystic Iron Works, Everett, Mass., may exceed basing point prices by $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Duty

Pa., Mo., Ky. $68.50

First Quality

Pa., Ill., Md., Mo., Ky.	54.40
Alabama, Georgia	54.40
New Jersey	59.35
Ohio	47.70

Second Quality

Pa., Ill., Md., Mo., Ky.	49.35
Alabama, Georgia	40.30
New Jersey	52.09
Ohio	38.35

Malleable Bung Brick

All bases 68.45

Silica Brick

Pennsylvania	54.40
Joliet, E. Chicago	62.45
Birmingham, Ala.	54.40

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry Press	32.80
Wire Cut	30.80

Magnesite

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00

Basic Brick

net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	54.00
Chem. bonded chrome	54.00
Magnesite brick	76.00
Chem. bonded Magnesite	65.00

Fluorspar

Metallurgical grade, f.o.b. Ill., Ky., net tons, carloads, CaF_2 content, 70% or more, $33; 65 but less than 70%, $32; 60 but less than 65% $31; less than 60%, $30. After Aug. 29 base price any grade $30.00 war chemicals.

Ferroalloy Prices

Ferromanganese (standard) 78-82% c.l. gross ton, duty paid, $135 f.o.b. cars, Baltimore, Philadelphia or New York, whichever is most favorable to buyer; Rockdale or Rockwood, Tenn.; where Tennessee Products Co. is producer; Birmingham, Ala., where Sloss-Sheffield Steel & Iron Co. is producer; $140 f.o.b. cars, Pittsburgh, where Carnegie-Illinois Steel Corp. is producer; add $6 for packed c.l., $10 for ton, $13.50 for less ton; $1.70 for each 1%, or fraction contained manganese over 82% or under 78%.

Ferromanganese (Low and Medium Carbon); per lb. contained manganese; eastern zone, low carbon, bulk, c.l., 23c; 2000 lb. to c.l., 23.40c; medium, 14.50c and 15.20c; central, low carbon, bulk, c.l., 23.30c; 2000 lb to c.l., 24.40c; medium 14.80c and 16.20c; western, low carbon, bulk, c.l., 24.50c, 2000 lb. to c.l., 25.40c; medium, 15.75c and 17.20c; f.o.b. shipping point, freight allowed.

Spiegeleisen: 19-21% carlots per gross ton, Palmerton, Pa., $36; Pittsburgh, $40.50; Chicago, $40.60.

Electrolytic Manganese: 99.9% plus, less ton lots, per lb. 37.6 cents.

Chromium Metal: 97% min. chromium, max. .50% carbon, eastern zone, per lb. contained chromium bulk, c.l., 79.50c, 2000 lb. to c.l. 80c; central 81c and 82.50c; western 82.25c and 84.75c; f.o.b. shipping point, freight allowed.

Ferrocolumbium: 50-60%, per lb. contained columbium in gross ton lots, contract basis, R. R. freight allowed, eastern zone, $2.25; less-ton lots $2.30. Spot prices 10 cents per lb. higher.

Ferrochrome: High carbon, eastern zone, bulk, c.l., 13c, 2000 lb. to c.l. 13.90c; central, add .40c and .65c; western, add 1c and 1.85c—high nitrogen, high carbon ferrochrome; Add 5c to all high carbon ferrochrome prices; all zones; low carbon eastern, bulk, c.l. max. 0.06% carbon, 23c, 0.10% 22.50c, 0.15% 22c, 0.20% 21.50c, 0.50% 21c, 1.00% 20.50c, 2.00% 19.50c; 2000 lb. to c.l., 0.06% 24c, 0.10% 23.50c, 0.15% 23c, 0.20% 22.50c, 0.50% 22c, 1.00% 21.50c, 2.00% 20.50c; central, add .4c for bulk, c.l. and .65 for 2000 lb. to c.l.; western, add 1c for bulk, c.l. and 1.85c for 2000 lb. c.l.; carload packed differential .45c; f.o.b. shipping point, freight allowed. Prices per lb. contained Cr high nitrogen, low carbon ferrochrome: Add 2c to low carbon ferrochrome prices; all zones. For higher nitrogen carbon add 2c for each .25% of nitrogen over 0.75%.

Special Foundry ferrochrome: (Chrom. 62-66%, car. approx. 5-7%) Contract, carload, bulk 13.50c, packed 13.95c, ton lots 14.40c, less, 14.90c, eastern, freight allowed, per pound contained chromium; 13.90c, 14.35c, 15.05c and 15.55c central; 14.50c, 14.95c, 16.25c and 16.75c, western; spot up .25c.

S.M. Ferrochrome, high carbon: (Chrom: 60-65%, sil. 4-6%, mang. 4-6% and carbon 4-6%.) Contract, carlot, bulk, 14.00c, packed 14.45c, ton lots 14.90c, less 15.40c, eastern, freight allowed; 14.40c, 14.85c, 15.55c and 16.05c, central; 15.00c, 15.45c, 16.75c and 17.25c, western; spot up .25c; per pound contained chromium.

S.M. Ferrochrome, low carbon: (Chrom. 62-66%, sil. 4-6%, mang. 4-6% and carbon 1.25% max.) Contract, carlot, bulk, 20.00c, packed 20.45c, ton lots 21.00c, less ton lots 22.00c, eastern, freight allowed, per pound contained chromium, 20.40c, 20.85c, 21.65c and 22.65c, central; 21.00c, 21.45c, 22.85c and 23.85c, western; spot up .25c.

SMZ Alloy: (Silicon 60-65%, Mang. 5-7%, zir. 5-7% and iron approx. 20%) per lb. of alloy contract carlots 11.50c, ton lots 12.00c, less 12.50c, eastern zone, freight allowed; 12.00c, 12.85c and 13.35c central zone; 14.05c, 14.60c and 15.10c, western; spot up .25c.

Silcaz Alloy: (Sil. 35-40%, cal. 9-11%, alum. 6-8%, zir. 3-5%, tit. 9-11% and boron 0.55-0.75%), per lb. of alloy contract, carlots 25.00c, ton lots 26.00c, less ton lots 27.00c, eastern, freight allowed, 25.50c, 26.75c and 27.75c, central; 27.50c, 28.90c and 29.90c, western; spot up .25c.

Silvaz Alloy: (Sil. 35-40%, van. 9-11%, alum. 5-7%, zir. 5-7%, tit. 9-11% and boron 0.55-0.75%), per lb. of alloy. Contract, carlots 58.00c, ton lots 59.00c, less 60.00c, eastern, freight allowed; 58.50c, 59.75c and 60.75c, central; 60.50c, 61.90c and 62.90c, western; spot up ¼c.

CMSZ Alloy 4: (Chr. 45-49%, mang. 4-6%, sil. 18-21%, zir. 1.25-1.75%, and car. 3.00-4.50%). Contract, carlots, bulk, 11.00c and packed 11.50c; ton lots 12.00c; less 12.50c, eastern, freight allowed; 11.50c and 12.00c, 12.75c, 13.25c, central; 13.50c and 14.00c, 14.75c, 15.25c, western; spot up .25c.

CMSZ Alloy 5: (Chr. 50-56%, mang. 4-6%, sil. 13.50-16.00%, zir. .75-1.25%, car. 3.50-5.00%) per lb. of alloy. Contract, carlots, bulk, 10.75c, packed 11.25c, ton lots 11.75c, less 12.25c, eastern, freight allowed; 11.25c, 11.75c and 12.50c, central; 13.25c and 13.75c, 14.50c and 15.00c, western; spot up .25c.

Ferro-Boron: (Bor. 17.50% min., sil. 1.50% max., alum. 0.50% max. and car. 0.50% max.) per lb. of alloy contract ton lots, $1.20, less ton lots $1.30, eastern, freight allowed; $1.2075 and $1.3075 central; $1.229 and $1.329, western; spot add 5c.

Manganese-Boron: (Mang. 75% approx., boron 15-20%, iron 5% max. sil. 1.50% max. and carbon 3% max.), per lb. of alloy. Contract ton lots, $1.89, less $2.01, eastern; freight allowed; $1.903 and $2.023, central, $1.935 and $2.055 western; spot up 5c.

Nickel-Boron: (Bor. 15-18%, alum. 1% max., sil. 1.50% max., car. 0.50% max., iron 3% max., nickel, balance), per lb. of alloy. Contract, 5 tons or more, $1.90, 1 ton to 5 tons, $2.00, less than ton $2.10, eastern, freight allowed; $1.9125, $2.0125 and $2.1125, central; $1.9445, $2.0445 and $2.1445, western; spot same as contract.

Chromium-Copper: (Chrom. 8-11%, cu. 88-90%, iron 1% max. sil. 0.50% max.) contract, any quantity, 45c, eastern, Niagara Falls, N. Y., basis, freight allowed to destination, except to points taking rate in excess of St. Louis rate to which equivalent of St. Louis rate will be allowed; spot up 2c.

Vanadium Oxide: (Fused: Vanadium oxide 85-88%, sodium oxide approx. 10% and calcium oxide, approx. 2%, or Red Cake; Vanadium oxide 85% approx., sodium oxide, approx. 9% and water approx.

2.5%) Contract, any quantity, $1.10 eastern, freight allowed per pound vanadium oxide contained; contract carlots, $1.105, less carlots, $1.108, central; $1.118 and $1.133, western; spot add 5c to contracts in all cases.

Calcium metal; east: Contract ton lots or more $1.80, less, $2.30, eastern zone, freight allowed, per pound of metal; $1.809 and $2.309 central, $1.849 and $2.349, western; spot up 5c.

Calcium-Manganese-Silicon: (Cal. 16-20% mang. 14-18% and sil. 53-59%), per lb. of alloy. Contract, carlots, 15.50c, ton lots 16.50c and less 17.00c, eastern, freight allowed; 16.00c, 17.35c, and 17.85c, central; 18.05c, 19.10c and 19.60c western; spot up .25c.

Calcium-Silicon: (Cal. 30-35%, sil. 60-65% and iron 3.00% max.), per lb. of alloy. Contract, carlot, lump 18.00c, ton lots 14.50c, less 15.50c, eastern, freight allowed; 13.50c, 15.25c and 16.25c central; 15.55c, 17.40c and 18.40c, western; spot up .25c.

Briquets, Ferromanganese: (Weight approx. 3 lbs. and containing exactly 2 lbs. mang.) per lb. of briquets. Contract, carlots, bulk .0605c, packed .063c, tons .0655c, less .068c eastern freight allowed; .063c, .0655c, .0755c and .078c, central; .066c, .0685c, .0855c, and .088c, western; spot up .25c.

Briquets: Ferrochrome, containing exactly 2 lb. cr., eastern zone, bulk, c.l., 8.25c per lb. of briquets, 2000 lb. to c.l., 8.75c; central, add .3c for c.l. and .5c for 2000 lb. to c.l.; western, add .70c for c.l., and .2c for 2000 lb. to c.l.; **silicomanganese,** eastern, containing exactly 2 lb. manganese and approx. ⅛ lb. silicon, bulk, c.l., 5.80c, 2000 lbs. to c.l., 6.30c; central, add .25c for c.l. and 1c for 2000 lb. to c.l.; western, add .5c for c.l., and 2c for 2000 lb. to c.l.; **ferrosilicon,** eastern, approx. 5 lb., containing exactly 2 lb. silicon, or weighing approx. 2½ lb. and containing exactly 1 lb. of silicon, bulk, c.l., 3.35c, 2000 lb. to c.l., 3.80c; central, add 1.50c for c.l., and .40c for 2000 lb. to c.l.; western, add 3.0c for c.l. and .45c for 2000 to c.l.; f.o.b. shipping point, freight allowed.

Ferromolybdenum: 55-75% per lb. contained molybdenum f.o.b. Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Ferrophosphorus: 17-19%, based on 18% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrosilicon: Eastern zone, 90-95%, bulk, c.l., 11.05c, 2000 lb. to c.l., 12.30c; 80-90%, bulk c.l., 8.90c, 2000 lb. to c.l., 9.95c; 75%, bulk, c.l., 8.05c, 2000 lb. to c.l., 9.05c; 50%, bulk c.l., 6.65c and 2000 lb. to c.l., 7.85c; central 90-95%, bulk, c.l., 11.20c, 2000 lb. to c.l., 12.80c; 80-90%, bulk, c.l., 9.05c, 2000 to c.l., 10.45c; 75%, bulk, c.l., 8.20c, 2000 lb. to c.l., 9.65c; 50% bulk, c.l., 7.10c, 2000 lb. to c.l., 9.70c; western, 90-95%, bulk, c.l., 11.65c, 2000 lb. to c.l., 15.60c; 80-90%, bulk, c.l., 9.55c, 2000 lb. to c.l., 13.50c; 75%, bulk, c.l., 8.75c, 2000 to c.l., 13.10c; 50%, bulk, c.l., 7.25c, 2000 to c.l., 8.75c; f.o.b. shipping point, freight allowed. Prices per lb. contained silicon.

Silicon Metal: Min. 97% silicon and max. 1% iron, eastern zone, bulk, c.l., 12.90c; 2000 lb. to c.l., 13.45c; central, 13.20c and 13.90c; western, 13.85c and 16.80c; min. 96% silicon and max. 2% iron, eastern, bulk, c.l., 12.50c, 2000 lb. to c.l., 13.10c; central, 12.80c and 13.55c; western, 13.45c and 16.50c f.o.b. shipping point, freight allowed. Price per lb. contained silicon.

Manganese Metal: (96% min. manganese, max. 2% iron), per lb. of metal, eastern zone, bulk, c.l., 30c, 2000 lb. to c.l., 32c, central, 30.25c, and 33c; western 30.55c and 35.05c.

Ferrotungsten: Spot, carlots, per lb. contained tungsten, $1.90; freight allowed as far west as St. Louis.

Tungsten Metal Powder. Spot, not less than 97 per cent, $2.50-$2.60; freight allowed as far west as St. Louis.

Ferrotitanium: 40-45%, R.R. freight allowed, per lb. contained titanium; ton lots $1.23; less-ton lots $1.25; eastern. Spot up 5 cents per lb.

Ferrotitanium: 20-25%, 0.10 maximum carbon; per lb. contained titanium; ton lots $1.35; less-ton lots $1.40 eastern. Spot 5 cents per lb. higher.

High-Carbon Ferrotitanium: 15-20% contract basis, per gross ton, f.o.b. Niagara Falls, N. Y., freight allowed to destination east of Mississippi River and North of Baltimore and St. Louis, 6.8% carbon $142.50; 3-5% carbon $157.50.

Carbortam: Boron 0.90 to 1.15% net ton to carload, 8c lb. f.o.b. Suspension Bridge, N. Y., frt. allowed same as high-carbon ferrotitanium.

Bortam: Boron 1.5-1.9%, ton lots 45c lb., less ton lots 50c lb.

Ferrovanadium: 35-55%, contract basis, per lb. contained vanadium, f.o.b. producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Zirconium Alloys: 12-15%, per lb. of alloy, eastern contract, carlots, bulk, 4.60c, packed 4.80c, ton lots 4.80c, less tons 5c, carloads, bulk, per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot ¼c per ton higher.

Zirconium Alloy: 35-40%, Eastern, contract basis, carloads in bulk or package, per lb. of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot ¼ cent higher.

Alsifer: (Approx. 20% aluminum, 40% silicon, 40% iron) contract basis f.o.b. Niagara Falls, N. Y., per lb. 5.75c; ton lots 6.50c. Spot ½ cent higher.

Siminal: (Approx. 20% each Si., Mn., Al.) Contract, frt. all. not over St. Louis rate, per lb. alloy; carlots 8c; ton lots 8.75c; less ton lots 9.25c.

Borosil: 3 to 4% boron, 40 to 45% Si., $6.25 lb. cont. Bo., f.o.b. Philo O., freight not exceeding St. Louis rate allowed.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Following prices are quotations developed by editors of STEEL in the various centers. For complete OPA ceiling price schedule refer to page 156 of Sept. 4, 1944, issue of STEEL. Quotations are on gross tons.

PHILADELPHIA:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$18.75
No. 2 Heavy Melt. Steel	18.75
No. 2 Bundles	18.75
No. 3 Bundles	16.75
Mixed Borings, Turnings	13.75
Machine Shop Turnings	13.75
Billet, Forge Crops	23.75
Bar Crops, Plate Scrap	21.25
Cast Steel	21.25
Punchings	21.25
Elec. Furnace Bundles	19.75
Heavy Turnings	18.25

Cast Grades

(F.o.b. Shipping Point)

Heavy Breakable Cast	16.50
Charging Box Cast	19.00
Cupola Cast	20.00
Unstripped Motor Blocks	17.50
Malleable	22.00
Chemical Borings	16.51

NEW YORK:

(Dealers' buying prices.)

No. 1 Heavy Melt. Steel	$15.33
No. 2 Heavy Melt. Steel	15.33
No. 2 Hyd. Bundles	15.33
No. 3 Hyd. Bundles	13.33
Chemical Borings	14.33
Machine Turnings	10.33
Mixed Borings, Turnings	10.33
No. 1 Cupola	20.00
Charging Box	19.00
Heavy Breakable	16.50
Unstrip Motor Blocks	17.50
Stove Plate	19.00

CLEVELAND:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$19.50
No. 2 Heavy Melt. Steel	19.50
No. 1 Comp. Bundles	19.50
No. 2 Comp. Bundles	19.50
No. 1 Busheling	19.50
Mach. Shop Turnings	14.50
Short Shovel Turnings	16.50
Mixed Borings, Turnings	14.50
No. 1 Cupola Cast	20.00
Heavy Breakable Cast	16.50
Cast Iron Borings	13.50-14.00
Billet, Bloom Crops	24.50
Sheet Bar Crops	22.00
Plate Scrap, Punchings	22.00
Elec Furnace Bundles	20.50

BOSTON:

(F.o.b. shipping points)

No. 1 Heavy Melt. Steel	$14.06
No. 2 Heavy Melt. Steel	14.06
No. 1 Bundles	14.06
No. 2 Bundles	14.06
No. 1 Busheling	14.06
Machine Shop Turnings	9.06
Mixed Borings, Turnings	9.06
Short Shovel Turnings	11.06
Chemical Borings	13.61
Low Phos. Clippings	16.56
No. 1 Cast	20.00
Clean Auto Cast	20.00
Stove Plate	19.00
Heavy Breakable Cast	16.50

Boston Differential 99 cents higher, steel-making grades; Providence $1.09 higher.

PITTSBURGH:

(Delivered consumer's plant)

Railroad Heavy Melting	$21.00
No. 1 Heavy Melt. Steel	20.00
No. 2 Heavy Melt. Steel	20.00
No. 1 Comp. Bundles	20.00
No. 2 Comp. Bundles	20.00
Short Shovel Turnings	17.00
Mach Shop Turnings	15.00
Mixed Borings, Turnings	15.00
No. 1 Cupola Cast	20.00
Heavy Breakable Cast	16.50
Cast Iron Borings	16.00
Billet, Bloom Crops	25.00
Sheet Bar Crops	22.50
Plate Scrap, Punchings	22.50
Railroad Specialties	24.50
Scrap Rail	21.50
Axles	26.00
Rail 3 ft. and under	23.50
Railroad Malleable	22.00

VALLEY:

(Delivered consumer's plant)

No. 1 R.R. Hvy Melt.	$21.00
No. 1 Heavy Melt. Steel	20.00
No. 1 Comp. Bundles	20.00
Short Shovel Turnings	17.00
Cast Iron Borings	16.00
Machine Shop Turnings	15.00
Low Phos. Plate	22.50

MANSFIELD, O.:

(Delivered consumer's plant)

Machine Shop Turnings	15.00

BIRMINGHAM:

(Delivered consumer's plant)

Billet Forge Crops	$22.00
Structural, Plate Scrap	19.00
Scrap Rails Random	18.50
Rerolling Rails	20.50
Angle Splice Bars	20.50
Solid Steel Axles	24.00
Cupola Cast	20.00
Stove Plate	19.00
Long Turnings	8.50- 9.00
Cast Iron Borings	8.50- 9.00
Iron Car Wheels	16.50-17.00

CHICAGO:

(Delivered consumer's plant)

No. 1 R.R. Hvy Melt.	$19.75
No. 1 Heavy Melt. Steel	18.75
No. 2 Heavy Melt. Steel	18.75
No. 1 Ind. Bundles	18.75
No. 2 Dlr. Bundles	18.75
Baled Mach. Shop Turn	18.75
No. 3 Galv. Bundles	16.75
Machine Turnings	13.75
Mix. Borings, Sht. Turn	13.75
Short Shovel Turnings	15.75
Cast Iron Borings	14.75
Scrap Rails	20.25
Cut Rails, 3 feet	22.25
Cut Rails, 18-inch	23.50
Angles, Splice Bars	22.25
Plate Scrap, Punchings	21.25
Railroad Specialties	22.75
No. 1 Cast	20.00
R.R. Malleable	22.00
(Cast grades f.o.b. shipping point, railroad grades f.o.b. tracks)	

BUFFALO:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$19.25
No. 2 Heavy Melt. Steel	19.25
No. 1 Bundles	19.25
No. 2 Bundles	19.25
No. 1 Busheling	19.25
Machine Turnings	14.25
Short Shovel Turnings	16.25
Mixed Borings, Turn.	14.25
Cast Iron Borings	15.25
Low Phos.	21.75

DETROIT:

(Dealers' buying prices.)

Heavy Melting Steel	$17.32
No. 1 Busheling	17.32
Hydraulic Bundles	17.32
Flashings	17.32
Machine Turnings	12.32
Short Shovel, Turnings	14.32
Cast Iron Borings	13.32
Low Phos. Plate	19.82
No. 1 Cast	20.00
Heavy Breakable Cast	16.50

ST. LOUIS

(Delivered consumer's plant)

Heavy Melting	17.50
No. 1 Locomotive Tires	20.00
Misc. Rails	19.00
Railroad Springs	22.00
Bundled Sheets	17.50
Axle Turnings	17.00
Machine Turnings	10.60
Shoveling Turnings	12.60
Rerolling Rails	21.00
Steel Car Axles	21.50-22.00
Steel Rails, 3 ft.	21.50
Steel Angle Bars	21.00
Cast Iron Wheels	20.00
No. 1 Machinery Cast	20.00
Railroad Malleable	22.00
Breakable Cast	16.50
Stove Plate	19.00
Grate Bars	15.25
Brake Shoes	15.25
(Cast grades f.o.b. shipping point)	
Stove Plate	18.00

CINCINNATI:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$18.50
No. 2 Heavy Melt. Steel	18.50
No. 1 Comp. Bundles	18.50
No. 2 Comp. Bundles	18.50
Machine Turnings	9.50-10.00
Shoveling Turnings	11.50-12.00
Cast Iron Borings	11.00-11.50
Mixed Borings, Turnings	10.50-11.00
No. 1 Cupola Cast	20.00
Breakable Cast	16.50
Low Phosphorus	21.00-21.50
Scrap Rails	20.50-21.00
Stove Plate	16.00-16.50

LOS ANGELES:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$14.00
No. 2 Heavy Melt. Steel	13.00
No. 1, 2, Deal. Bundles	12.00
Machine Turnings	4.50
Mixed Borings, Turnings	4.00
No. 1 Cast	29.00

SAN FRANCISCO:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$15.50
No. 2 Heavy Melt. Steel	14.50
No. 1 Busheling	15.50
No. 1, No. 2 Bundles	13.50
No. 3 Bundles	9.00
Machine Turnings	7.00
Billet, Forge Crops	15.50
Bar Crops, Plate	15.50
Cast Steel	15.50
Cut, Structural, Plate, 1", under	18.00
Alloy-free Turnings	7.00
Tin Can Bundles	14.50
No. 2 Steel Wheels	15.50
Iron, Steel Axles	23.00
No. 2 Cast Steel	15.50
Uncut Frogs, Switches	15.50
Scrap Rails	15.50
Locomotive Tires	15.50

Copper: Electrolytic or Lake from producers in carlots 12.00c, Del. Conn., less carlots 12.12½c, refinery; dealers may add ¼c for 5000 lbs. to carload; 1000-4999 lbs. 1c; 500-999 1½c; 0-499 lbs. Castings, 11.75c, refinery for 20,000 lbs., or more, 12.00c less than 20,000 lbs.

Brass Ingot: Carlot prices, including 25 cents per hundred freight allowance; add ¼c for less than 20 tons; 85-5-5-5 (No. 115) 13.00c; 80-10-2 (No. 215) 16.50c; 80-10-10 (No. 305) 14.75c; Navy G (No. 225) 16.75c; Navy M (No. 245) 14.75c; No. 1 yellow (No. 405) 14.00c; manganese bronze (No. 420) 12.75c.

Zinc: Prime western 8.25c, select 8.35c, brass special 8.50c, intermediate 8.75c, E. St. Louis, carlots. For 20,000 lbs. to carlots add 15c; 10,000-20,000 0.25c; 2000-10,000 0.40c; under 2000 0.50c.

Lead: Common 6.35c, chemical, 6.40c, corroding, 6.45c, E. St. Louis for carloads; add 5 points for Chicago, Minneapolis-St. Paul, Milwaukee-Kenosha districts; add 15 points for Cleveland-Akron-Detroit area, New Jersey New York state, Texas, Pacific Coast, Richmond, Indianapolis-Kokomo; add 20 points for Birmingham, Connecticut, Boston-Worcester, Springfield, New Hampshire, Rhode Island.

Primary Aluminum: 99% plus, ingots 15.00c lb., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lbs. and over; add ½c 5000-9999 lbs.; 1c less through 2000 lbs.

Secondary Aluminum: All grades 12.50c per lb. except as follows: Low grade piston alloy (No. 12 type) 10.50c; No. 12 foundry alloy (No. 12 grade) 10.50c; chemical warfare service ingot (92½% plus) 10.00c; steel deoxidizers 2-inch notch bars, granulated or shot, Grade 1 (95-97½%) 11.00c, Grade 2 (92-95%) 9.50c to 9.75c, Grade 3 (90-92%) 8.50c to 8.75c, Grade 4 (85-90%) 7.50c to 8.00c; any other ingot containing over 1% iron, except PM 754 and hardness, 12.00c. Above prices for 30,000 lb. or more; add ¼c 10,000-30,000 lb.; ½c 1000-10,000 lbs.; 1c less than 1000 lbs. Prices include freight at carload rate up to 75 cents per hundred.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, 17 lbs.) 20.50c lb., add for special shapes and sizes. Alloy ingots, incendiary bomb alloy, 23.40c; 50-50 magnesium-aluminum, 23.75c; ASTM B93-41T, Nos. 2, 3, 4, 12, 13, 14, 17, 23.00c; Nos. 4X, 11, 13X, 17X, 25.00c; ASTM B-107-41T, or B-90-41T, No. 8X, 23.00c; No. 18, 23.50c; No. 18X, 25.00c. Selected magnesium crystals, crowns, and muffs, including all packing greening, barrelling, handling, and other preparation charges, 23.50c. Price for 100 lbs. or more; for 25-100 lbs., add 10c; for less than 25 lbs., 20c. Incendiary bomb alloy, f.o.b. plant, any quantity; carload freight allowed all other alloys for 500 lbs. or more.

Tin: Prices ex-dock, New York in 5-ton lots, add 1 cent for 2240-11,199 lbs., 1½c 1000-2239. ½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 52.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05 per cent maximum arsenic, 51.87½c; Grade C, 99.65-99.79% incl. 51.62½c; Grade D, 99.50-99.64% incl., 51.50c; Grade E, 99-99.49% incl. 51.12½c; Grade F, below 99% (for tin content), 51.00c.

Antimony: American bulk carlots f.o.b. Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 14.50c; 99.8% and over (arsenic, 0.05%, max. and other impurities, 0.1%, max.) 15.00c. On producers' sales add ¼c for less than carload to 10,000 lb.; ½c for 9999-224 lb.; and 2c for 223 lb. and less; on sales by dealers, distributors and jobbers add ½c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.5%, f.o.b. refinery 35.00c lb.; pig and shot produced from electrolytic cathodes 36.00c; "F" nickel shot or ingot for additions to cast iron, 34.00c; Monel shot 28.00c.

Mercury: Open market, spot, New York, $93-98 per 76-lb. flask.

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be., $17 lb. contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks, and all other "regular" lots. 34.00c f.o.b. Niagara Falls.

straight or flat forms 90.00c lb., del.; anodes, balls, discs and all other special or patented shapes 95.00c lb. del.

Cobalt: 97-99%, $1.50 lb. for 550 lb. (bbl.); $1.52 lb. for 100 lb. (case); $1.57 lb. under 100 lb.

Indium: 99.9%, $7.50 per troy ounce.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, N. Y. 70.625c per ounce.

Platinum: $35 per ounce.

Iridium: $165 per troy ounce.

Palladium: $24 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass product prices based on 12.00c, Conn., for copper. Freight prepaid on 100 lbs. or more.)

Sheet: Copper 20.87c; yellow brass 19.48c; commercial bronze, 90% 21.07c, 95% 21.28c; red brass 80% 20.15c, 85% 20.36c; phosphor bronze, Grades A and B 5% 36.25c; Everdur, Herculoy, Duronze or equiv. 26.00c; naval brass 24.50c; manganese bronze 28.00c; Muntz metal 22.75c; nickel silver 5% 26.50c.

Rods: Copper, hot-rolled 17.37c, cold-rolled 18.37c; yellow brass 15.01c; commercial bronze 90% 21.32c, 95% 21.53c; red brass 80% 20.48c, 85% 20.61c; phosphor bronze Grade A, B 5% 36.50c; Everdur, Herculoy, Duronze or equiv. 25.50c; Naval brass 19.12c; manganese bronze 22.50c; Muntz metal 18.87c; nickel silver 5% 26.50c.

Seamless Tubing: Copper 21.37c; yellow brass 22.23c; commercial bronze 90% 23.47c; red brass 80% 22.80c, 85% 23.01c.

Extruded Shapes: Copper 20.87c; architectural bronze 19.12c; manganese bronze 24.00c; Muntz metal 20.12c; Naval brass 20.37c.

Angles and Channels: Yellow brass 27.98c; commercial bronze 90% 29.57c, 95% 29.78c; red brass 80% 28.65c, 85% 28.86c.

Copper Wire: Soft, f.o.b. Eastern mills, carlots 15.37½c, less-carlots 15.87½c; weatherproof, f.o.b. Eastern mills, carlot 17.00c, less-carlots 17.50c; magnet, delivered, carlots 17.50c, 15,000 lbs. or more 17.75c, less carlots 18.25c.

Aluminum Sheets and Circles: 2s and 3s flat mill finish, base 30,000 lbs. or more; del; sheet widths as indicated; circle diameter 9" and larger:

Gage	Width	Sheets	Circles
.249"-7	12"-48"	22.70c	25.20c
8-10	12"-48"	23.20c	25.70c
11-12	26"-48"	24.20c	27.00c
13-14	26"-48"	25.20c	28.50c
15-16	26"-48"	26.40c	30.40c
17-18	26"-48"	27.90c	32.90c
19-20	24"-42"	29.80c	35.30c
21-22	24"-42"	31.70c	37.20c
23-24	3"-24"	25.60c	29.20c

Lead Products: Prices to jobbers; full sheets 9.50c; cut sheets 9.75c; pipe 8.15c, New York; 8.25c, Philadelphia, Baltimore, Rochester and Buffalo; 8.75c, Chicago, Cleveland, Worcester, Boston.

Zinc Products: Sheet f.o.b. mill, 13.15c; 36,000 lbs. and over deduct 7%; Ribbon and strip 12.25c, 3000-lb. lots deduct 1%, 6000 lbs. 2%, 9000 lbs. 3%, 18,000 lbs. 4%, carloads and over 7%. Boiler plate (not over 12") 3 tons and over 11.00c; 1-3 tons 12.00c; 500-2000 lbs. 12.50c; 100-500 lbs. 13.00c; under 100 lbs. 14.00c. Hull plate (over 12") add 1c to boiler plate prices.

Plating Materials

Chromic Acid: 99.75%, flake, del., carloads 16.25c; 5 tons and over 16.75c; 1-5 tons 17.25c; 400 lbs. to 1 ton 17.75c; under 400 lbs. 18.25c.

Copper Anodes: Base 2000-5000 lbs., del.; oval 17.62c; untrimmed 18.12c; electro-deposited 17.37c.

Copper Carbonate: 52-54% metallic cu, 250 lb. barrels 20.50c.

Copper Cyanide: 70-71% cu, 100-lb. kegs or

Sodium Cyanide: 96%, 200-lb. drums 15.00c; 10,000-lb. lots 13.00c f.o.b. Niagara Falls.

Nickel Anodes: 500-2999 lb. lots; cast and rolled carbonized 47.00c; rolled, depolarized 48.00c.

Nickel Chloride: 100-lb. kegs or 275-lb. bbls. 18.00c lb., del.

Tin Anodes: 1000 lbs. and over 58.50c del.; 500-999 59.00c; 200-499 59.50c; 100-199 61.00c.

Tin Crystals: 400 lb. bbls. 39.00c f.o.b. Grasselli, N. J.; 100-lb. kegs 39.50c.

Sodium Stannate: 100 or 300-lb. drums 36.50c, del.; ton lots 33.50c.

Zinc Cyanide: 100-lb. kegs or bbls. 33.00c f.o.b. Niagara Falls.

Brass Mill Allowances: Prices for less than 15,000 lbs. f.o.b. shipping point. Add ½c for 15,000-40,000 lbs.; 1c for 40,000 or more.

Scrap Metals

	Clean Heavy	Rod Ends	Clean Turnings
Copper	10.250	10.250	9.500
Tinned Copper	9.625	9.625	9.375
Yellow Brass	8.625	8.375	7.785
Commercial bronze 90%	9.375	9.125	8.625
Commercial bronze 95%	9.500	9.250	8.750
Red Brass, 85%	9.125	8.875	8.375
Red Brass, 80%	9.125	8.875	8.375
Muntz Metal	8.000	7.750	7.250
Nickel Sil, 5%	9.250	9.000	4.625
Phos. br., A, B, 5%	11.000	10.750	9.750
Herculoy, Everdur or equivalent	10.250	10.000	9.250
Naval brass	8.250	8.000	7.500
Mang. bronze	8.250	8.000	7.500

Other than Brass Mill Scrap: Prices apply on material not meeting brass mill specifications and are f.o.b. shipping point; add ¾c for shipment of 60,000 lbs. of one group and ½c for 20,000 lbs. of second group shipped in same car. Typical prices follow:

(Group 1) No. 1 heavy copper and wire, No. 1 tinned copper, copper borings 9.75c; No. 2 copper wire and mixed heavy copper, copper tuyeres 8.75c.

(Group 2) soft red brass and borings, aluminum bronze 9.00c; copper-nickel and borings 9.25c; car boxes, cocks and faucets 7.75c; bell metal 15.50c; babbit-lined brass bushings 13.00c.

(Group 3) zincy bronze borings, Admiralty condenser tubes, brass pipe 7.50c; Muntz metal condenser tubes 7.00c; yellow brass 6.25c; manganese bronze (lead 0.00%-0.40%) 7.25c, (lead 0.41%-1.0%) 6.25c; manganese bronze borings (lead 0.00-0.40%) 6.50c, (lead 0.41-1.00%) 5.50c.

Aluminum Scrap: Price f.o.b. point of shipment, truckloads of 5000 pounds or over; Segregated solids, 2S, 3S, 5c lb., 11, 14, etc., 3 to 3.50c lb. All other high grade alloys 5c lb. Segregated borings and turnings, wrought alloys, 2, 2.50c lb. Other high-grade alloys 3.50, 4.00c lb. Mixed plant scrap, all solids, 2, 2.50c lb. borings and turnings one cent less than segregated.

Lead Scrap: Prices f.o.b. point of shipment. For soft and hard lead, including cable lead, deduct 0.55c from basing point prices for refined metal.

Zinc Scrap: New clippings 7.25c, old zinc 5.25c f.o.b. point of shipment; add ½-cent for 10,000 lbs. or more. New die-cast scrap, radiator grilles 4.95c, add ½c 20,000 or more. Unsweated zinc dross; die cast slab 5.80c any quantity.

Nickel, Monel Scrap: Prices f.o.b. point of shipment; add ½c for 2000 lbs. or more of nickel or cupro-nickel shipped at one time and 20,000 lbs. or more of Monel. Converters (dealers) allowed 2c premium.

Nickel: 98% or more nickel and not over ½% copper 26.00c; 90-98% nickel, 26.00c per lb. nickel contained.

Cupro-nickel: 90% or more combined nickel and copper 26.00c per lb. contained nickel, plus 8.00c per lb. contained copper; less than 90% combined nickel and copper 26.00c for contained nickel only.

Monel: No. 1 castings, turnings 15.00c; new clipping 20.00c; soldered sheet 18.00c.

Sheets, Strip . . .

Sheet & Strip Prices, Page 200

Sheet demand has loaded mills with so much tonnage that no delivery promises are being made, orders being accepted for shipment under the quota system when they can be scheduled. Determination of mill backlogs is practically impossible, further than that output is covered well into next year. Despite strike threats against important sheet consumers shipments are being taken fully, with storage arrangements to tide over expected interruptions. Some producers are out of the market.

Pittsburgh — Sellers are screening new business more carefully as orders continue to exceed production schedules. It is believed consumers are seeking to buy light flat-rolled steel tonnage in excess of their known manufacturing schedules and there is much shopping with probability of considerable duplication in orders. Mills are not turning down orders, but they are accepted without definite delivery promise. Sellers are not scheduling production more than three months ahead, and consequently a true picture of order backlogs is not obtainable. Despite prospect of disruption to production in the automotive and other industries, pressure for early steel delivery continues acute, and there are indications arrangements have been made for stocking steel in event of strikes, for such interruptions to production schedules are not expected to last long. Pre-war customer relationships and emphasis on production of the more remunerative items are the basis upon which sellers today are distributing available tonnage. Rough estimates of delivery schedules on present order backlogs place cold-rolled sheets in April and May, hot-rolled pickled nearly as far extended, with electrical and galvanized sheets in late second quarter.

New York — Most sellers of hot and cold-rolled sheets still have difficulty setting up quotas for first quarter, although the necessary lead time is near at hand. Most count on a 45-day lead, although one large interest has decided upon a 30-day lead on hot-rolled sheets.

Sellers generally are directing attention to first quarter only on hot and cold sheets and as they already have far more tonnage offered than they can supply in that period, they are to all practical intents out of the market. One producer of electric coated sheets, while not setting this material up on a quota basis, withdrew from the market a few days ago. Within a period of three weeks this seller's deliveries had jumped from February to July.

Boston — Heavier buying of narrow cold-rolled strip for typewriter assembly parallels sharp increases in production goals; Royal Typewriter Co., Hartford, Conn., aims at 12,000 a week early next year, compared with 8400 prewar. Sold through first quarter, cold strip mills are booking for the second, although some producers are holding orders in abeyance beyond end of March. Fabricators, striving to get up production, are seeking materials for inventory in addition to nearby requirements. As in sheets there is evidence of duplicate inquiry. Within sheet quotas there are few openings for first quarter. Demand for cold-rolled is heavy, including 1000 tons for bumper stock. Light gages are especially scarce and most contract terminated surplus, which included considerable 22-gage has been absorbed.

Cincinnati — Pressure for sheet deliveries has been increasing, with some dissatisfaction over tonnage allotments. Mills attempting a quota system have encountered cases where tonnage above that taken in 1940 is sought. The word backlog has disappeared from discussions, orders being definitely accepted when the tonnage is scheduled for rolling, on a month-to-month basis. Tightness of supply is indicated by the eagerness with which occasional offerings in odd specifications are seized.

St. Louis — Sheet production locally has risen to about 80 per cent of capacity, compared with 65 to 70 per cent a month ago. This is due mainly to better labor supply. Finishing labor continues scarce. Flat-rolled products generally are sold to fourth quarter of 1946 although some capacity is open in June and July for galvanized sheets, and in April for tin plate. Virtually all tonnage is allocated to district offices for allotment.

Birmingham — Sheet production is slightly better than 60 per cent of capacity and civilian demand has increased until loss of wartime tonnage is not felt. Demand is much greater than output and mills have heavy commitments.

Cleveland—Production of sheet and strip will be curtailed for several months due to the unfavorable labor situation. Mills are making some progress in restor-

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★ PERCENTAGE OF AIR EXCESS OR DEFICIENCY

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ng operations to the pre-coal-strike level but are unable to increase them sufficiently to reduce order backlogs. Mills generally are not making firm delivery promises and some open books for only one quarter ahead.

Steel companies have adopted quite generally a policy of selective selling, restricting sales in territories where any appreciable freight or extra handling charges must be absorbed and discouraging placement of orders for products on which the profit margin is smallest. One large consumer reports that mills in some instances have been shipping him heavy gage sheet instead of light plate which he normally uses. This proves more profitable and conserves plate tonnage for customers who cannot shift to the use of sheet.

Chicago — New sheet business is heavy, but pressure for deliveries is not as intense, the latter situation being difficult to comprehend. All mills employ their own rationing system in allotting sheets to consumers. In one instance, a sheetmaker requires that customers file specifications against cold-rolled sheet allotments on order books 30 days in advance of the month of rolling. This producer can accept no new business on hot-rolled sheets and strip for delivery before April, and cold-rolled before June.

Philadelphia — Where sheets are not being sold on a strictly quota basis deliveries on hot and cold-rolled material run late in second quarter and early third, in certain instances, with exceptions in heavy gages. Galvanized sheets, outside quotas, are promised for late June and July. Some leading sheet sellers are carrying the same warehouse load as was set up during the war and now, as then, are falling far short of giving distributors what they want. Jobbers are ordering further ahead than earlier in the fall, some buying through June, not only in sheets but practically all products.

Steel Bars . . .

Bar Prices, Page 200

Small sizes of carbon bars are sold well into next year, some producers being booked into third quarter. On medium and large diameters deliveries can be promised for first quarter. Alloy bars are easier than carbon and in some instances December delivery can be had. Cold-drawn bars are promised for January and February.

New York — Some sellers are endeavoring to set up hot carbon bars on a quota basis; others are not. There is a considerable scarcity in small sizes, with some sellers actually booked into third quarter; however, medium and large rounds are still available for shipment late in first quarter in some important instances. Certain producers, in fact, can still quote February on large sizes. Hot alloy bars can still be had in some quarters for shipment in late December, although most producers appear to be in a little stronger position. Hot heat-treated alloy bars are running four to five weeks beyond.

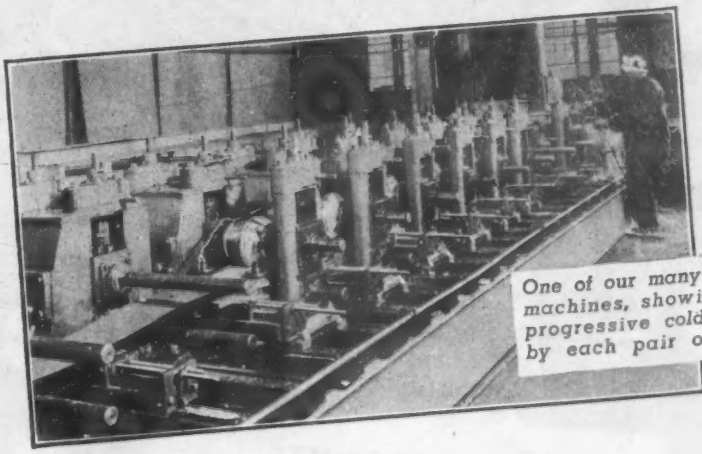
Pittsburgh — Mills are scheduled into May on small carbon bars, but large rounds and alloys are promised for early first quarter delivery. Due to restricted production resulting from limited supply of carbon bars, cold-rollers are now booked well into first quarter. Pressure for delivery of all bar products is heavy, although some easing has developed in isolated instances. Automotive, farm and railroad equipment manufacturers are accepting all tonnage scheduled for early shipment and continue to place commitments for second quarter delivery. With mill schedules on carbon and alloy steel bars gradually recovering, consumers in turn are stepping up operation from the low point reached in the week following the coal strike.

Boston — Most bar fabricators are completing the cycle back to normal products; earlier confusion affecting grades and sizes is clarifying. Larger forge shops, producing for the automobile industry instead of aircraft, increase carbon specifications in ratio to alloys and need smaller sizes. This holds to some extent with other fabricators and accounts substantially for the slack in alloy buying. Most consumers, including textile mill equipment builders, have covered well into first quarter, and there is a lull in new orders.

St. Louis — Pressure is increasing for bar tonnage and deliveries have been deferred into May and June.

No deliveries are promised before February. Mills, striving to complete repairs before the end of this tax year, are operating about 25 per cent under capacity. Full operation is not expected before mid-January. No relief in pressure is expected before third quarter unless duplication of orders is larger

Brasco
ROLLED SECTIONS



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Brasco Rolled Sections, in all metals, are used for functional, structural and decorative parts in a wide variety of manufactured products. A few applications—edging, mouldings, trim, slides, bases, frames, rims, sash, guides, flashing and reinforcement.

With thousands of stock dies on hand, the necessity for special fabrication can often be avoided but we also roll to specifications from dies made in our own factory.

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(Dept. R) — HARVEY (Chicago Suburb) ILLINOIS

than expected. Labor supply for bar mills is improving.

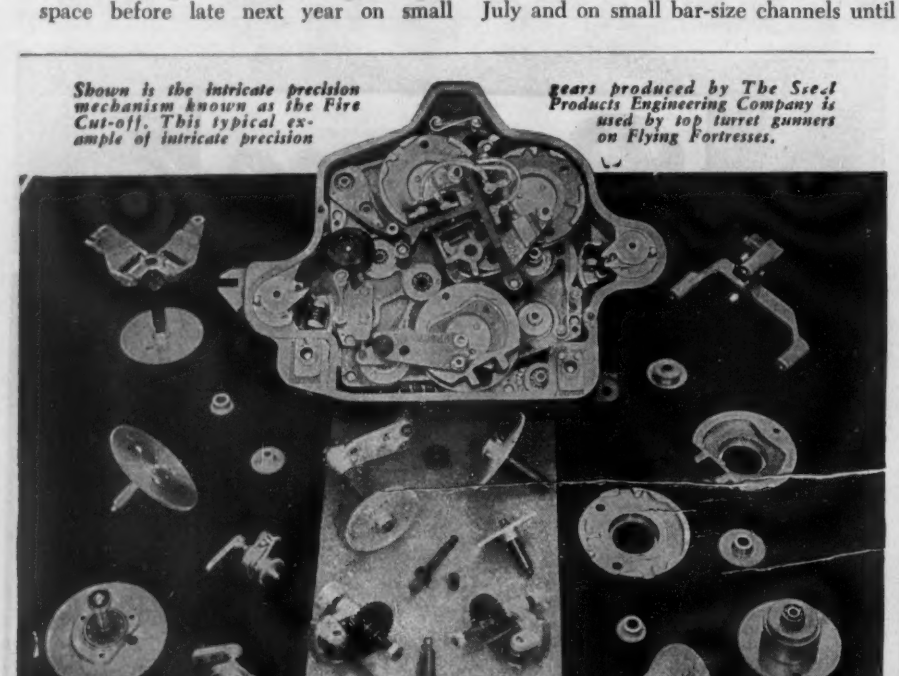
Boston — Starting Dec. 1 another large supplier of carbon bars will allocate definite tonnage to customers through first quarter on a monthly basis and will ask cancellation of tonnage in excess of allotments. The same producer will put into effect a like policy on shapes and bar shapes, starting Jan. 1.

Cleveland — Considerable steel bar tonnage was lost here last month due to the fuel shortage and deliveries from several mills have not been up to schedule. This will necessitate readjustment in delivery schedules for several months. Deliveries on new business are extended, with one large interest having no open space before late next year on small sizes of hot-rolled bars and first quarter on larger sizes. Cold-rolled bars are available in February. Automotive partsmakers are still active in the bar market.

Chicago—Deliveries on both quality and hot-rolled carbon bars are extending further, evidencing general heavy buying of consumers. Most manufacturers have unbalanced inventories and seek to round them out. April and May are the prevailing delivery dates on all grades of carbon bars; alloys on the other hand are available in December through January.

Philadelphia — Emphasis in hot carbon bars continues in light sizes. One leading producer is out of the market on rounds 1½ inches and smaller until July and on small bar-size channels until August. On all other sizes, however, this interest can supply at least a limited supply for March. The situation with other producers varies, with some able to supply hot carbon bars for February. Cold-drawn carbon bars are quoted generally for late January and February.

Shown is the intricate precision mechanism known as the Fire Cut-off. This typical example of intricate precision gears produced by The Steel Products Engineering Company is used by top turret gunners on Flying Fortresses.



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Steel Plates . . .

Plate Prices, Page 201

Plate demand is increasing and the situation is tightening, important sellers now quoting February and March. One factor is diversion of semifinished steel to other products. Fabrication of small tanks, mainly for gasoline stations, accounts for considerable tonnage. Plate demand is better than had been expected.

Boston — Plate requirements for railroad passenger cars are higher, further increasing the ratio of light material. The $1.5 million expansion by Pullman-Standard Mfg. Co., Worcester, Mass., includes installation of much additional heavy welding equipment. Railroads are buying sparingly, less than expected. In other directions, notably small tank and boiler shops, orders are better than estimated. Substantial portion of heavier plates moving is to flame-cutting and weldment shops. Depending on production lost and availability of semi-finished, deliveries among mills vary as much as two months with January delivery still possible with the more fortunate producers. Surplus at the Walsh-Kaiser shipyard, Providence, R. I., is coming out for liquidation.

New York — While sheared plates are still available in January and February, the situation is steadily tightening, due in part to diversion of metal to other products. Demand is more active than a month ago and in general is in excess of trade expectations. Export demand, following a brief lull, again has picked up sharply, some producers declare. Demand for light gage plates, and also sheets of heavier gages, for fuel oil storage tanks continues strong. Several large oil companies have extensive programs for filling stations. Sun Oil Co., Philadelphia, for instance, plans construction of 400 service stations during the next 12 months.

Birmingham — Plate production is at about 50 per cent of the wartime peak with heavy backlog and insistent demand for deliveries. Tankmakers account for a large part of current demand. A fair tonnage of plates is still needed for shipbuilding.

Chicago — One of the amazements in steel circles is tightness which has developed in steel plates. However, general demand from heavy industries, such as tank and railroad car building, has taken up the slack. One important platemaker in this district is unable to schedule new business on wide plate before March and narrow sizes before June.

Philadelphia — Plate demand is expanding and while shipments can be obtained in January some producers are booked solidly into February and March. Three plate producers, including two district mills, shared in more than 500 tons for the 160 locomotives recently booked by Baldwin Locomotive Works for France. Forty additional locomotives are pending for France, bringing recent requirements to 360.

Tubular Goods . . .

Tubular Goods Prices, Page 201

New York — With winter approaching, demand for merchant pipe for maintenance and repairs has now about reached its fall peak. Distributors, who generally are now obtaining pipe from mills on a restricted monthly quota basis, are having difficulty keeping supplies in balance.

Unfinished and cold-drawn carbon tubes are not distributed on a quota basis and deliveries now fall mainly in January, although in certain items of cold-drawn tubing February is being quoted. Alloy tubing shipments range five to eight weeks on hot-finished and certain other descriptions. Light aircraft and mechanical tubing can be had for delivery within a month.

Pittsburgh — Sellers are booked into second quarter on standard merchant pipe and little headway has been made in improving delivery in recent weeks. Shipments on pressure and mechanical tubing are not extended as much, with boiler tubes available in January and February and cold-drawn mechanical tubing in December. Mill delivery position on tubing compares with eight months' extended shipment schedules at the peak in war requirements. Pipe jobbers' inventories are well below normal, and there appears to be little possibility they can be restored to desired levels this year. The Navy's surplus goods disposal office here will take bids Nov. 23 on 216,035 feet of SAE 1020 cold-rolled tubing.

Cleveland — Operations at pipe mills are gradually returning to normal following curtailments last month due to fuel shortage. Output of one large company, cut to 44 per cent of schedule, will reach between 55 and 60 per cent this month and is expected to reach 100 per cent by the yearend. This loss in production will delay scheduled shipments several months and has extended deliveries on new business to second half on most sizes. Most demand now is from manufacturers, although jobbers' stocks have suffered. Mills are attempting to eliminate duplication of orders and many are not accepting new customers.

Pipe mills are in comfortable position on oil country goods with open positions in each month of first quarter. Heavy demand is pending. Inquiry includes several lines of 10 to 20 miles, requiring 5000 to 10,000 tons each of 6¼ to 12¼-inch. Heavy export business is developing in a highly competitive market. An English firm already has shipped a large tonnage of seamless tubing to Venezuela and promises six weeks delivery on South American shipments. French, Czechoslovakian and Polish firms may enter the market some time next year.

Wire . . .

Wire Prices, Page 201

New York—Although makeup of wire mill backlogs has shifted substantially with most producers, aggregate volume approaches wartime peak, with no place for many items before second quarter. Mills are screening and allocating orders but pressure is strong, fabricators claiming they are pinched for some types of manufacturers' wire, springs and high-carbon flat material. Galvanizing departments of some mills are crowded and additional orders are held up. Demand for cold-heading wire is unabated.

Boston — No easing of pressure for wire deliveries is apparent and with heavy backlogs, orders for second quarter and beyond are numerous on a wide range of specialties. Producers are rationing available tonnage, generally on a monthly basis through first quarter, including razor blade stock and clock spring wire. Expecting heavier production early in the year fabricators of finished wire products are buying for inventory in addition to nearby requirements and most of this inquiry cannot be processed before second quarter.

Pittsburgh—Further reduction in dealers' inventories of merchant wire occurred the past few weeks, and on the basis of prospective demand and production the remainder of this year, likelihood of building stocks during this period is not promising. The fact that current production is falling behind immediate needs prevents accumulation to meet heavy requirements expected next spring. Nails and fencing are in particularly short supply.

With elimination of production quotas Oct. 1 many dealers and consumers have placed orders for substantially larger tonnages than during the war. In contrast to heavy increase in orders, output has made only a slight gain for steel producers have been forced, under present price ceilings, to place emphasis on

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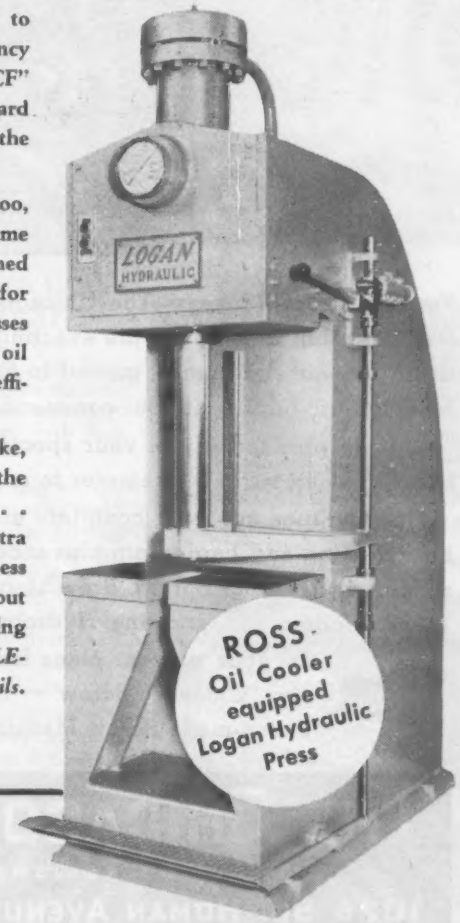

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output of other steel items. Order backlogs for fencing, barbed wire, nails and other merchant wire items extend through first quarter. In most instances, orders on mill books are larger than at any time during the war.

Tin Plate . . .

Tin Plate Prices, Page 201

Pittsburgh — Despite reports that tin mines in the Dutch East Indies are in better condition than earlier predicted, no easing in WPB order M-81 is probable until further clarification of the overall tin supply situation. It is held that lifting of controls over tin would result in rapid dissipation of tin stocks (estimated at about 30,000 tons) and a period of dearth in which there would be insufficient supplies either for essential food preservation or for minimum industrial requirements. The first easing in the order restricting use of tin is likely to be in lifting of regulations governing application of 0.25-pound electrolytic tin plate coatings. WPB recently pointed out that through restrictions consumption of tin in the canning industry has been reduced from 42,000 tons in 1941 to an expected figure of 24,000 tons in 1946; strict conservation has brought the use of tin in automobiles from almost four pounds per car before the war to less than two pounds today.

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Rails, Cars . . .

Track Material Prices, Page 201

New York — Domestic freight car awards in October involved 1320 units, compared with 12,840 in September, highest for the year to date. Bookings for the first 10 months amount to 39,666, against 36,911 in the corresponding period of last year.

Indications point to a larger total for the current month, with outstanding pending inquiries previously noted, involving 1000 automobile box cars for the Southern Railway, 600 cars for the Nickel Plate and 550 for the Elgin, Joliet & Eastern. Meanwhile, passenger car demand continues to expand, with current inquiry heaviest since before the war.

Structural Shapes . . .

Structural Shape Prices, Page 201

Chicago — New business coming out in substantial volume recently is giving structural fabricators heavy backlogs. This, coupled with the fact that deliveries on plain material from mills are becoming more extended, is forcing many fabricators to decline to quote on many jobs. Awards of over 100 tons in the midwestern area in the past few days has aggregated in excess of 14,000 tons, and in addition there have been innumerable small lettings. New inquiry is much lighter. Some district mills are unable to promise heavy sections before February and light before July.

Boston — Potential structural steel requirements are substantial, but active inquiry and lettings are down; for a racetrack grandstand at Lincoln, R. I., 600 tons are placed, third pony run in the smallest of states. To the heavy backlog of work held by Stone & Webster Engineering Corp., Boston, is added a steam electric generating station for Standard Oil Co. at Whiting, Ind. While January delivery on larger sizes of plain shapes is possible with some mills, small sizes are in February and beyond with producers not pressing for tonnage in the latter range.

Birmingham — Demand for shapes is heavy and consistent, producers being unable to meet demand for current needs. Bookings are solid for the remainder of the year and into next.

Philadelphia — While shape mills and fabricating shops are extending backlogs, building demand locally is light. One large producer is quoting March and April on standard shapes and February and March on wide-flange. February appears the best that can be done on both standard and wide-flange.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 201

Chicago — Inquiries for reinforcing bars and other material are going begging here because of the tight steel situation. Supply is far below demand and suppliers restrict activities to projects they can handle if they prove successful bidders. Even the most optimistic interests see little improvement during the remainder of the year.

Pig Iron . . .

Pig Iron Prices, Page 203

Pig iron production is improving as banked stacks resume after the coal

strike, but inventories still are short. Labor supply in foundries shows some improvement, though still tight. In spite of recent low production melters have been supplied sufficient to avoid shutdowns.

Pittsburgh — Pig iron production here is now back to about normal with 45 out of 54 units active, compared with only 24 at one time during the period of the coal strike. Some units are still banked because of inadequate fuel supply, with at least one furnace blown out, due to unprofitable operations under present price ceilings, but most are down for relining. Labor shortage continues an important factor in retarding full utilization of available units. While supply of pig iron is in very close balance with requirements, no foundries have had to curtail operations for lack of iron.

New York — On a daily basis November pig iron production in this district is expected to be somewhat higher than in October. However, in view of the extra holidays and the fact that November is a shorter month than last, total output is likely to be smaller.

Foundrymen are encouraged by a somewhat improved labor supply. In the Brooklyn area, for instance, there are now actually more coremakers than there are jobs and the situation with respect to molders is improving. However, there is still considerable shortage in molder's helpers.

Boston — Pig iron melters approach winter with inventories frequently under 30 days; past experience indicates this a dangerously small margin, but likelihood of early improvement in supplies is doubtful, although some consumers have permits to stock over 30 days if they can get the iron. With water route closing, one steelworks has iron from the Troy, N. Y., furnace to last into next year; this unit is now running foundry and malleable. Buffalo is making some progress on overdue deliveries.

Cincinnati—Pig iron is being received by district melters in volume to maintain operations. Some lag in shipments reflects recent furnace curtailments, but this is having no serious effect. A feature is the almost general request for more iron, by an estimated 25 per cent, this month than last. Undoubtedly some requests are with intent to bring inventories closer to the 30-day basis, after depletion of stocks during coal mine strikes. Demand for castings is sustained; stove foundries are expanding melt as rapidly as possible.

Buffalo — In spite of tonnage lost because of strikes, leading pig iron producers report a self-rationing program has been successful in keeping foundries in operation. However, melt is down, as iron was apportioned to foundries which had coke and could operate. Civilian backlogs of foundries are expanding and makers of stoves, radiators, furnace and automotive castings call for more iron. Production in this district is curtailed to about 80 per cent of capacity.

Chicago — Foundries continue to operate on small iron supply. So far as can be ascertained, however, no shops have been forced to curtail from iron shortage. However, it will be impossible to make up lost production and a tight situation seems certain for the balance of the year. Currently, 32 of the district's 41 blast furnaces are operating. During the past week, Carnegie-Illinois Steel Corp. has returned five stacks to activity, and Inland Steel has returned one.

Philadelphia — Demand for foundry pig iron is accelerated by improved foundry operations and lack of cast scrap. Improved melt is ascribed to a slight gain in labor. Basic requirements are gaining as ingot production recovers. First quarter contracting is expected to start soon.

Scrap . . .

Scrap Prices, Page 204

Scrap scarcity continues, although sufficient is being gathered to serve current needs. Melters continue to take all tonnage offered and seek to add to reserves for winter. Higher freight equalization and springboards are being paid to obtain supplies from remote points.

Pittsburgh — Movement of iron and steel scrap is well sustained following the lull during the coal strike. It is becoming increasingly difficult to meet steady demand for heavy melting steel and cast scrap, although in connection with the latter consumers are more inclined to pay higher freight equalization as result of recent boost of 75 cents per gross ton in pig iron prices. Up to $1 freight equalization continues to be paid for machine shop and short shoveling turnings, while $1.50 springboard on heavy melting steel is reported. Recent offers of landing mat scrap all went at

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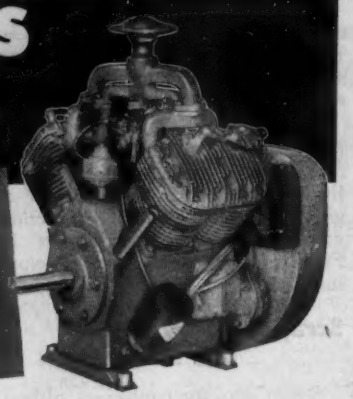

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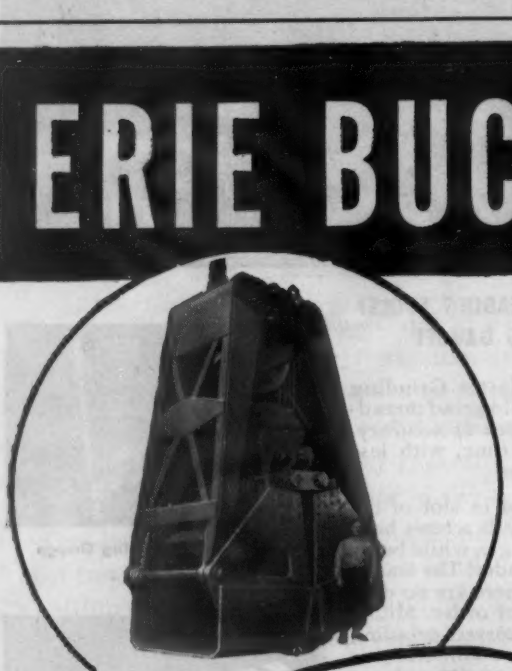

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ceilings, some of which found its way into this district, making the delivered price slightly over $20 a ton after payment of $7 freight from Fort Eustis, Va., and 50-cent brokerage commission.

Scrap dealers state they are unable to compete with consumers for unprepared scrap and have petitioned OPA to increase the spread between prepared and unprepared material to $5 from the present $3.50 a ton.

Cleveland — Tightness continues in scrap, steelmakers needing more than suppliers are able to obtain and more costly grades continue to be bought for open-hearth use. While restoration of fairly normal pig iron supply has eased the situation slightly demand has not reflected this to any extent. Blast furnace grades are in strong demand and cast grades continue scarce.

Buffalo — Mills appear willing to take as much scrap as dealers can obtain. A sale of 10,000 tons is reported and another large lot is expected to be placed soon. Increased receipts by water is expected as the navigation season closes. A cargo of 5000 tons from Duluth and about 8000 tons by barge from the seaboard have arrived and two more barge fleets with 5000 to 8000 tons are expected. Specialties are scarce here because of shipments to Valley consumers.

Chicago — Scrap maintains activity and ceiling prices prevail. Shipments are high although available supply is well below demand. Steel mill operations are again approaching full capacity and banked blast furnaces are resuming to provide normal amount of hot metal. Although it is generally believed that scrap will remain tight through the winter, no critical shortage is anticipated.

Boston — Demand for good quality heavy melting steel is active; supply of No. 1 dealer scrap and carbon turnings is limited. Railroads and shipyards have moderate tonnages with indications liquidations at the latter will increase. Some tonnage offered as contract terminated surplus will eventually be sold as scrap. In holding strictly to specifications as to carbon steel, consumers are buying bundles from regular sources. Steelworks have around 45-day inventories, but seek tonnage to hold at least at that level for winter. Cast grades are still tight.

Although the lot was smaller, 600 tons, bidding at ceiling is keen for landing mat material, more consumers quoting direct. This scrap is attractive, unprepared, but readily sheared in form of pierced steel planks, component parts of airfield mats, 16½ inches wide, 10 feet long and ⅛-inch thick. In wired bundles of 30 pieces each, a unit weighs approximately 1900 pounds. Delivery is f.o.b. Boston port of embarkation with daily carloading 20 to 25 cars. Eight quoted ceiling, $11.55, f.o.b. Boston, and four over ceiling, Luntz Iron & Steel Co., high at $12.33 wiring to ship to Canton, O., yard.

Cincinnati — Demand for iron and steel scrap, despite lack of heavy buying, is well sustained. All grades are moving steadily as major melters seek to retain reserves. Tightness in pig iron and a temporary curtailment in hot metal also increased scrap requirements. Prices are firm, but so far there has been resistance toward remote material on which higher freight was asked.

St. Louis — Improved yard labor

supply has increased scrap shipments and receipts from remote points are better. Terminated war contracts offer more tonnage. Demand for foundry grades lags. Two plants of the American Steel Foundries have been out of the market for two months, which has affected foundry scrap. Open-hearth buying is at average rate.

Los Angeles — Shipyard and aircraft scrap production is virtually at an end. Since these have been the principal sources of scrap in southern California dealers believe collections will be uncertain until automotive scrap appears. Prices continue $5 to $6 under ceilings for No. 1 heavy melting. Mills are no longer competing with dealers as most offerings now are unprepared. Overall supply is adequate.

Birmingham — Scrap supply is tight, both steel and foundry grades being in steady demand at ceiling prices. With relighting of a repaired blast furnace within the next fortnight pressure will be relieved somewhat.

New York — Pittsburgh buyers again have entered the local scrap market, paying up to $1 springboard on heavy melting steel. This demand, in addition to substantial requirements for eastern Pennsylvania and Sparrows Point, is absorbing heavy melting steel about as fast as it is being prepared. Shortage of cast scrap and borings and turnings continues acute.

Philadelphia — With possibly two exceptions, consumers of heavy melting steel are buying freely to build winter reserves. One buyer is out of the market because production has been heavily hit by ordnance cancellations and until recently by a strike of several weeks, and is still drawing on inventories, as far as can be learned. Reconversion scrap is coming out in substantial quantities and is accumulating at yards because of labor shortage. However, prices for this are holding fairly well and in the case of landing mat steel very well. Latest sales of 12,000 tons of landing mat scrap at Norfolk, Va., brought ceiling, successful bidders including one from the middle west. Borings, turnings and cast are exceedingly scarce.

Warehouse . . .

Warehouse Prices, Page 202

New York — Warehouse stocks are becoming more unbalanced and depleted with no overall improvement in replacements; under quotas, designed to spread mill volume, distributors are getting considerably less tonnage than under CMP. Demand for warehouse steel, however, approaches wartime peaks, with larger inquiry for plates and alloys, which have lagged. Galvanized and light black sheets, shapes and strip are short with most jobbers, with inquiries coming in from distant points, including mill.

Pittsburgh — Shipments out of distributors' stocks improved 10 to 15 per cent last month. Unusually heavy demand is noted in sheets, strip, small bars and structurals. Interruption of mill finishing operations, resulting from the coal strike, has accentuated unbalanced inventory. Distributors are in the same position as individual consumers in the scramble for available steel production.

Los Angeles — Warehouse business is at about 60 per cent of the wartime peak,

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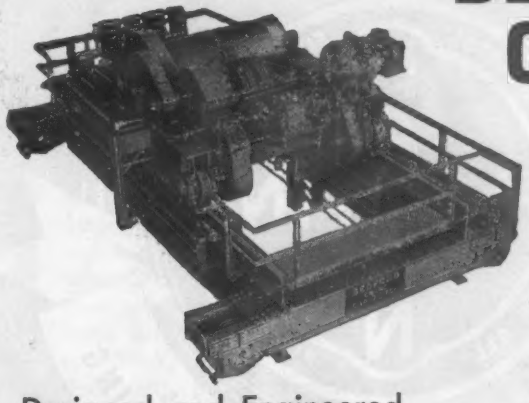

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with number of orders about the same but for smaller quantities. Polished stainless sheets and cold-finished shafting are in heavy demand. Mill deliveries are months delayed as a result of the coal strike.

Cleveland — Warehouses received less steel last month than scheduled, throwing their stock further out of balance. Bar stocks, especially ½-inch and smaller, and wire products are tight. Alloy products, however, are comparatively easy. Average size of orders has increased well above normal, many being for 1500 tons and up.

Iron Ore . . .

Iron Ore Prices, Page 202

Lake Superior iron ore moved in October totaled 9,826,622 gross tons, compared with 10,594,988 tons in the comparable month last year, according to the Lake Superior Iron Ore Association, Cleveland. This was a loss of 768,366 tons, 7.25 per cent. October tonnage included 47,437 tons of Canadian ore loaded at Superior, Wis., in addition to that loaded at Michipicoten and Port Arthur. Details of October shipments are as follows, in gross tons:

	October, 1945	October, 1944
Escanaba	472,484	757,167
Marquette	557,142	381,316
Ashland	550,856	762,729
Superior	3,267,999	3,102,305
Duluth	2,749,682	2,744,730
Two Harbors	2,120,888	2,782,965
Total U. S. Ports	9,725,051	10,531,212
Michipicoten	70,621	63,776
Port Arthur	30,950	. . . .
Total Canadian	101,571	63,776
Grand Total	9,826,622	10,594,988

Decrease from year ago, 768,366 tons, 7.25 per cent.

For the season to Nov. 1 cumulative shipments totaled 71,498,393 tons, compared with 76,498,172 tons to the same date last year, a decline of 4,999,779 tons, 6.54 per cent. For the season to Nov. 1 Canadian ore loaded at Superior totaled 297,408 tons. Details of season shipments are as follows, in gross tons:

	To Nov. 1, 1945	To Nov. 1, 1944
Escanaba	4,201,574	5,222,144
Marquette	3,582,864	3,505,344
Ashland	4,070,860	5,269,476
Superior	23,256,402	24,664,793
Duluth	19,175,774	19,334,070
Two Harbors	16,688,895	18,085,872
Total U. S. Ports	70,976,369	76,081,699
Michipicoten	414,937	416,473
Port Arthur	107,087	. . . .
Total Canadian	522,024	416,473
Grand Total	71,498,393	76,498,172

Decrease from year ago, 4,999,779 tons, 6.54 per cent.

Canada . . .

Toronto, Ont. — With demand gaining steadily, consumers meet more difficulty obtaining steel for current needs. Buying is maintained at a brisk pace and on some materials producers already have filled books for first quarter. Steel plate is about the only material still available this year and there is no rush by plate consumers to add to their bookings. Canada's plate production now is entirely from Ontario mills as the Sydney plate mill that was taken over

by the government about a year ago has been closed down. Steel production in Nova Scotia also is well down from the year's high rate. While Ontario mills are working at virtual capacity on ingot production there has been minor slowing up in some rolling departments.

The labor situation has shown a radical change in the past month or six weeks and instead of a surplus of jobs, many workers now are looking for employment and National Selective Service has abandoned many of its restrictions in an effort to keep workers employed. However, mining companies, steel plants, and some of the heavy industries are seeking workers, and there is still shortage of skilled labor. With the exception of the strike at the Windsor plant of the Ford Co. of Canada, labor troubles have been minor, although a number of small disputes have been reported recently.

Up to this time there has been no easing in sheet supply and consumers have difficulty obtaining enough for current needs, with the result that civilian production continues to lag. Galvanized sheets are specially scarce and it is reported that even supplies for some small jobs are not available. Warehouse stocks of sheets have almost disappeared and no replacements are reported. However, there is hope that there will be improvement in the sheet supply around the end of this month when the new sheet and strip mill goes into production at Hamilton.

Structural steel lettings are increasing and producers report backlogs well into 1946. Fabricators also are operating close to capacity and are from a month to six weeks behind on deliveries. It is stated that prospective orders for structural shapes now exceed 50,000 tons for projects to be started early in the new year, while awards for the past week amounted to approximately 8000 tons.

The scrap shortage is becoming more acute daily, and dealers state that there are no indications of early improvement. Receipts continue to fall off and only small quantities now are coming from industrial plants and there is steady drying up of shipments from rural districts. Scrap reserves are at the lowest point in many years and there is little hope of consumers obtaining sufficient for winter needs without assistance from the United States. Dealers state that lifting of ceiling prices would not improve the supply from Canadian sources, as the scrap is not there.

STRUCTURAL SHAPES . . .

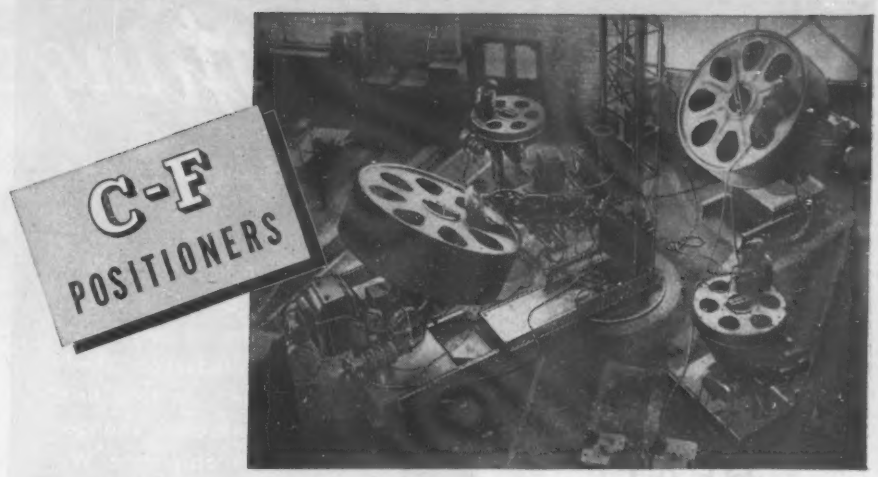
STRUCTURAL STEEL PLACED

5436 tons, various locations, for Atchison, Topeka & Santa Fe railroad; 4990 tons, timber trestle caps, to Joseph T. Ryerson & Son Inc., Chicago; 382 tons, beam spans, to Bethlehem Steel Co., Bethlehem, Pa.; 64 tons, turntable repairs, to American Bridge Co., Pittsburgh; bids Oct. 8; erroneously reported in STEEL for Oct. 22 as awarded to Kansas City Structural Steel Co., Bethlehem Steel Co. and Consolidated Steel Corp. of Texas, respectively.

3000 tons, assembly plant, Hopeville, Ga., for Ford Motor Co., to Ingalls Iron Works, Birmingham, Ala.

2850 tons, foundry, pattern shop and power house, Saginaw, Mich., for Chevrolet Motor Car Division, General Motors Corp., to American Bridge Co., Pittsburgh; bids June 5.

1500 tons, aero coach plant, East Chicago, Ind., for General American Transportation Corp.,



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Four C-F Positioners are grouped radially around one automatic welding machine—2 No. 12s (1,200 lb. capacity) in diagonally opposite corners, 2 No. 140s (14,000 lb. capacity) in the other corners. With this arrangement, the single automatic welding machine can serve all 4 positioners and is used for all peripheral welds on the weldments. For this operation, the positioner rotates the tilted weldment under the electrode at any desired speed from 0 r.p.m. up. While the automatic welding machine is busy on one weldment, 3 welders are completing the hand welding operations on the other 3 C-F Positioners, which under push button control, turn and tilt weldment to any desired position permitting all welds to be easily made "down hand".

CULLEN-FRIESTEDT CO.

1308 S. Kilbourn Ave., Chicago 23, Ill.

JOHNSON *Wire*

SPECIAL ALLOY FINISH

Entirely new development in wire coating that gives better than two to three times the rust resistance of tin. Smooth, satin finish that acts as a lubricant, reducing tool wear. Will not flake or peel. Used successfully where extreme acid or gasoline fume conditions exist. Coating does not affect physical properties. Solders better than tin.

A major wire development . . . a better coating than tin . . . can be substituted for tin. No government restrictions. Sizes .003" to .08".

JOHNSON STEEL & WIRE CO., INC.

WORCESTER 1, MASSACHUSETTS

NEW YORK AKRON CHICAGO LOS ANGELES

Let's talk this thing over...

GALVANIZED PRODUCTS AND PRODUCTION HEAT TREATING

Manufacturers of
GALVANIZED & FABRICATED
WELDED TUBING
TENT POLE HARDWARE

We can't sit down to a Peace Conference just yet and Commercial Metals Treating, Inc. is busy maintaining war-time production schedules. However, we must take time to plan for the peacetime changeovers that will inevitably come. We have expanded our facilities enormously and will soon be able to handle pieces up to 20' in length in galvanized products. We will be glad to assist you with your present and post-war metals treating problems and invite your inquiries.

"A Material Difference"

COMMERCIAL METALS TREATING, INC.
TOLEDO, OHIO

GETTING AROUND IN NEW YORK

is quick and easy when you're staying at The Roosevelt—just a short stroll from key business centers, shops, theatres. And Hilton service assures your comfort. Rooms with Bath from $4.50.

Hotel Roosevelt

Dean Carpenter, *General Manager*
MADISON AVENUE at 45th STREET, NEW YORK

OTHER HILTON HOTELS INCLUDE
Chicago: The Stevens • Dayton: The Dayton-Biltmore
Los Angeles: The Town House
C. N. Hilton, *President*

HOTELS FROM COAST TO COAST HILTON

DIRECT ENTRANCE TO GRAND CENTRAL TERMINAL

to American Bridge Co., Pittsburgh.

1200 tons, plant for Hercules Powder Co. at Parlin, N. J., to Ingalls Iron Works, Birmingham, Ala.

1200 tons, factory building, Grand Rapids, Mich., for Diesel Equipment Division, General Motors Corp., to R. C. Mahon Co., Detroit.

950 tons, addition to plant, Milwaukee, for Froedtert Grain & Malting Co., to Milwaukee Bridge Co., Milwaukee; bids Oct. 22.

680 tons, new building, Indianapolis, for E. C. Atkins & Co., to Central States Bridge & Structural Co., Indianapolis; bids Oct. 22.

617 tons, 12 girder spans, Cheyenne, Wyo., for Union Pacific railroad, to Kansas City Structural Steel Co., Kansas City, Kans.; bids Oct. 30.

520 tons, Immaculate Conception School, East Thirteenth St., Manhattan, to Bethlehem Fabricators, Bethlehem, Pa., through George A. Fuller Co., general contractor.

500 tons, du Pont Sabine river works, Orange, Tex., to Consolidated Steel Corp., Los Angeles.

500 tons, can factory and warehouse, Sacramento, Calif., for Continental Can Co., to American Bridge Co., Pittsburgh.

426 tons, highway bridge over Fox river at Oneida street, Appleton, Wis., to Bethlehem Steel Co., Bethlehem, Pa.; L. G. Arnold Inc., Eau Claire, Wis., contractor; bids Oct. 16.

420 tons, three buildings for Ortho Pharmaceutical Co., Bridgewater Township, N. J., to Bethlehem Steel Co., Bethlehem, Pa., through John W. Ryan, New York, general contractor.

275 tons, mill building, Aurora, Ill., for All-Steel Equip Co., to Joseph T. Ryerson & Son Inc., Chicago.

142 tons, conveyor head, Hurley, Wis., for Pickands, Mather & Co., to Wisconsin Bridge & Iron Co., Milwaukee; bids June 12.

Unstated, Ford parts and distribution building, Seattle; to Virginia Bridge Co., Roanoke, Va.

STRUCTURAL STEEL PENDING

1100 tons, buildings Nos. 18, 20, 21 and 22, Lansing, Mich., for Fisher Body Division, General Motors Corp.; bids Oct. 16.

600 tons, grandstand, race track, Lincoln, R. I.

450 tons, addition to warehouse, Chicago, for Central Steel & Wire Co.

400 tons, factory building, Kalamazoo, Mich., for Upjohn Co.

200 tons, drydock subdivision, Puget Sound Navy Yard; Scheurmann & Johnson, Seattle, low, $433,878.

Unstated, also tanks, pipe lines, etc., plant for California Asphalt Co., at Willbridge, Oreg.; bids in at San Francisco.

Unstated, gantry and other cranes; bids to Reclamation Bureau, Denver, Nov. 28.

Unstated, Pudding River bridge, Oregon; J. F. Johnson, Newburg, low at $140,847.

Unstated, three structures at Troutdale, Oreg.; bids to Bonneville Power Adm., Nov. 16.

REINFORCING BARS . . .

REINFORCING BARS PLACED

300 tons, factory building, Proctor & Schwartz, Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

200 tons, Ford Motor Co. at Chester, Pa., to Bethlehem Steel Co., Bethlehem, Pa., through Irwin & Leighton, Philadelphia.

200 tons, acid treatment plant, Whiting, Ind., for Standard Oil Co. of Indiana, to Joseph T. Ryerson & Son Inc., Chicago; M. W. Kellogg Co., contractor.

100 tons, Willow Springs grade separation over Chicago, Milwaukee, St. Paul & Pacific railroad, for Cook county, Illinois, to Joseph T. Ryerson & Son Inc., Chicago; bids Oct. 22.

REINFORCED BARS PENDING

4750 tons, intercepting sewer, Chicago, for Chicago Sanitary District; bids Nov. 8.

100 tons, store, Peoria, Ill., for Woolworth Co.; V. Jobst & Sons, Peoria, Ill., contractor.

USE HEADED AND THREADED FASTENERS FOR ECONOMY AND RELIABILITY

BOLTS · NUTS STUDS

Carbon Steel – Heat-treated Alloy Steels – Stainless Steel – Silicon Bronze – Brass – Bronze – Monel Metal.

Accurately made in standard dimensions or to your own specifications.

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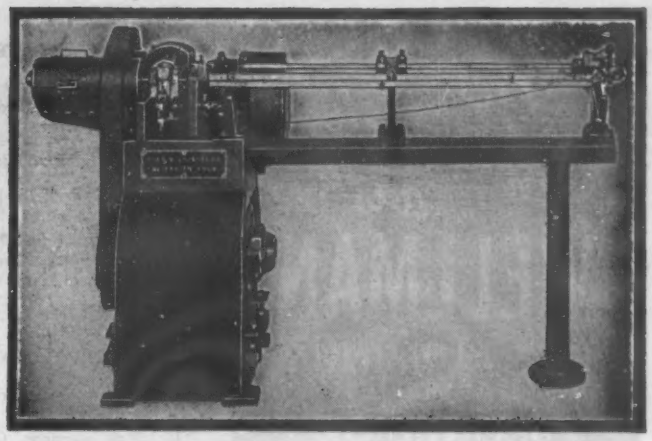
"THE BOLT MAN"

MANUFACTURING COMPANY

327 Pine Street • Pawtucket, R. I.

THE PLACE TO SOLVE YOUR BOLT PROBLEMS



SHUSTER WIRE STRAIGHTENER TYPE A
Wire Capacity 1/32"—1/16" Diameter

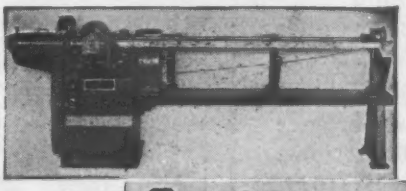
Faster Cutting Speeds

GREATER PRODUCTION!

Outstanding Features—

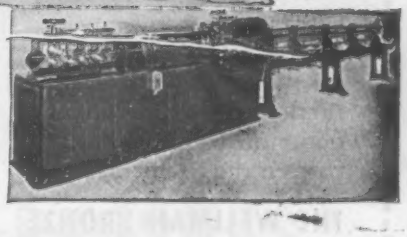
Almost continuous wire travel
Lightning cut-off assures square-cut ends
High speed, direct driven 5-die straightening flier
Quiet, highly efficient V-belt motor drive
Ball and roller bearings throughout
Extremely rigid construction
Fully guaranteed as to material and workmanship.

Descriptive folder on request.



Type 1A
1/16"—3/16"
Dia.

Type 2A
⅛"—¼"
Dia.



Type 3A
3/16"—3/8" Dia.
Type 4A (not shown)
3/8"—5/8" Dia.

The F. B. Shuster Mfg. Co., Inc., New Haven, Conn.

SHUSTER

Automatic

WIRE STRAIGHTENING AND CUTTING MACHINES

Since 1866

Get in Touch with
WELLMAN
FOR ALUMINUM
(HEAT-TREATED)
BRONZE OR
MAGNESIUM
CASTINGS

WOOD OR METAL
PATTERNS

In addition to their high quality and accuracy, Wellman aluminum and magnesium sand castings offer important plus advantages for your future products.

Our 35 years' experience (15 years' in Magnesium) and modern laboratory, foundry and pattern shop facilities are among the important reasons why we believe we can work advantageously with your company.

Phone, wire or write and we shall be glad to supply further information and quote on your casting and pattern requirements.

THE WELLMAN BRONZE & ALUMINUM COMPANY
GENERAL OFFICES
2539 EAST 93rd STREET
CLEVELAND 4, OHIO

WELLMAN
Means WELL-CAST

PLATES . . .

PLATES PLACED

Unstated, 36-inch water system extension for Portland, Oreg., to Steel Tank & Pipe Co., Portland.

PLATES PENDING

833 tons, sheet steel piling for Port of Grays Harbor, Wash.; bids in at Aberdeen, Wash.

Unstated, 1020 feet 20-in. steel pipe for Yakima project; bids to Bureau of Reclamation, Yakima, Wash., Nov. 20.

PIPE . . .

CAST IRON PIPE PENDING

500 tons, various sizes, for Yakima, Wash.; bids Nov. 13.

100 tons or more, Oak Lodge district, 4 and 6-in., Fortland, Oreg.; bids in.

100 tons, Tracyton, Wash.; bids in.

100 tons or more, Camas, Wash.; bids Nov. 13.

100 tons or more, Colville, Wash.; bids Nov. 6.

RAILS, CARS . . .

RAILS PLACED

Pennsylvania, 156,000 tons, for 1946 delivery, 78,000 tons to Carnegie-Illinois Steel Corp., 69,000 tons to Bethlehem Steel Co., 9000 tons to Inland Steel Co.; 50,000 tons of accessories to be bought as required.

LOCOMOTIVE PLACED

The Alton, 10 diesel-electric 1000-horsepower switch engines, to American Locomotive Co., New York; authorized by federal court.

Pennsylvania, ten 6000-hp diesel-electric passenger locomotives to Electromotive division of General Motors Corp., La Grange, Ill.

Weaknesses in Surplus Property Set-Up Aired

(*Concluded from Page 94*)

policy the large chain store, the mail order house and the co-operative would be eligible to buy at the 'big retailer' price level, which is at a discount of 10 per cent below the highest price charged the smallest retailer."

His office could not agree with this policy, said Mr. Bradley, "not only on the ground that it is commercially unsound but also because in my opinion it violates a number of the provisions of the Surplus Property Act (that section pertaining to small business particularly) and is in direct violation of the Price Control Act, the Robinson-Patman Act, and OPA pricing policy.

"To illustrate the latter violation," he continued, "we need only to look at the new Surplus Property Administration's recommendation for pricing the several million shotgun shells recently offered by OSP. Had we followed the pricing schedule furnished us in writing by the Surplus Property Administration the shells would have been sold as follows:

Wholesalers	$28.52 per 1000
Large retailers and chains	31.11 " "
Average retailer	32.41 " "
Small retailer	33.71 " "

"The Office of Price Administration's published ceiling covering sales by manufacturers to wholesalers is $25.93 per 1000 shells, the ceiling price to retailers (large or small) is $32.41."

CONSTRUCTION AND ENTERPRISE

OHIO

BARBERTON, O.—Ohio Brass Co. plans a one-story 146 x 400-foot plant addition estimated to cost about $250,000. C. W. Conklin, Farmers Bank Bldg., Mansfield, O., is architect.

CLEVELAND—Cleveland Steel Products Co., 7306 Madison Ave., plans factory buildings on West 117th St., to cost about $500,000. George S. Rider Co., Terminal Tower, is consulting engineer.

CLEVELAND—George F. Adler Brass Foundry, 1510 University Ave., is having plans made by C. F. Guenther, 13124 Shaker Square, for four plant buildings, including 60 x 125-foot foundry, 40 x 125-foot core and pattern building, 40 x 40-foot furnace room and 35 x 40-foot office building, at Harvard Ave., and Jennings Rd., estimated to cost $75,000.

CLEVELAND—Mohawk Industries Inc. has been incorporated with $500 capital and 250 shares no par value to manufacture metal castings and equipment. Alfred H. Huck, 570 Morewood Parkway, Rocky River, O., is agent.

CLEVELAND—Anchor Foundry Co. has been incorporated with 1200 shares to manufacture foundry products. Benjamin R. Goldman, 513 Society for Savings Bldg., is agent.

CLEVELAND—E. F. H. Aluminum Foundry & Smelting Co., 3300 East 87th St., will build a one-story addition 40 x 175 feet.

CLEVELAND—Hampsted Mfg. Co. Inc., has been incorporated with $500 capital and 100 shares no par value to manufacture power tools and tool and diemakers' supplies. Albert Kline Jr., 5713 Euclid Ave., is agent.

GALION, O.—Carter Machine Co. has let contract to E. A. Hacker, 109½ Harding Way, for a 52 x 260-foot factory, estimated to cost $50,000.

MASSILLON, O.—Canton Metal Decorating Co., C. W. Lappin, president, 2808 Winfield Highway NE, is having plans drawn by Firestone & Motter, 1412 Cleveland Ave. NW, for a factory, estimated to cost about $100,000.

NORTH CANTON, O.—Spiker Products Co., 414 West Maple St., plans erection of a plant for manufacture of hangars for private planes, to cost about $40,000.

WARREN, O.—Peerless Electric Co. will build an addition 100 x 176 feet, two stories, on West Market St.

WARREN, O.—Falls Welding & Mfg. Co. has been incorporated with 250 shares no par value and will establish its operations on the site formerly occupied by the Pilgrim Trailer Co. J. Don Campbell, Warren, is agent.

MASSACHUSETTS

FRAMINGHAM, MASS.—General Motors Corp., Framingham, will let contract soon for a one-story 965 x 1035-foot assembly unit, 75 x 115-foot service unit, 32 x 35-foot acetylene unit, to cost about $1 million. Albert Kahn Associated Architects & Engineers Inc., New Center Bldg., Detroit, is engineer.

LOWELL, MASS.—City plans an incinerator to cost about $160,000. Stephen Kearney is city engineer.

CONNECTICUT

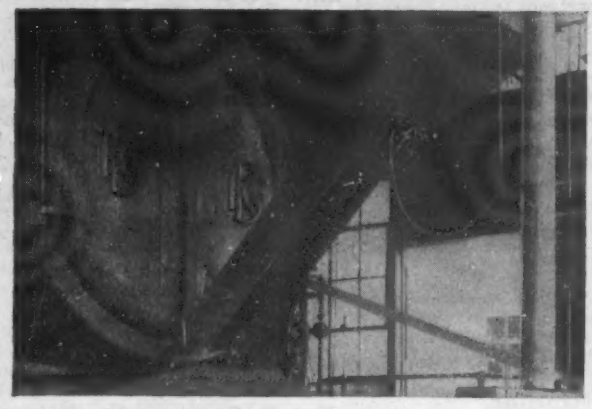
BRIDGEPORT, CONN.—Bryant Electric Co., H. E. Seim, president, 1421 State St., plans a three-story 95 x 240-foot finishing plant, to cost about $650,000.

BRIDGEPORT, CONN.—Progress Mfg. Co., M. C. Kitchell, manager, 140 James St., plans a two-story 45 x 75-foot plant to cost

SYNTRON

"Pulsating Magnet"

ELECTRIC VIBRATORS



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eliminate costly material stoppages, by preventing "arching-over" and "hanging-up."

"Vibra-Flow"

VIBRATORY FEEDERS

Provide RHEOSTAT CONTROL of Material Flow

increase the efficiency of crushers, screens, pulverizers, etc.

SYNTRON COMPANY

370 LEXINGTON, HOMER CITY, PA.

FULLERGRIP *Spiraled* BRUSHES

as well as Horizontal Brush Strips are used on Scrubbing machines, or to remove foreign material from sheet or strip metal; used on continuous sheet scrubbers, galvanizing and bran removal operations.

THE FULLER BRUSH COMPANY

INDUSTRIAL DIVISION, 3582 MAIN STREET, HARTFORD 2, CONN.

Difficult Fabrication is EASIER

with "Simplified" ARC WELDING with Exclusive Remote Control

It's impossible for you to drag your welding machine down in the double-bottom of a "Victory" ship or high in the air on a big construction job . . . however, with a Hobart you can have the same fine adjustments of welding heats as if your machine was right at your side. Hobart's "Remote Control" is small and convenient enough to be carried anywhere. It allows you to make the correct heat adjustments for every application, whether it be overhead, vertical or horizontal welding . . . assuring you of sound, ductile welds at all times.

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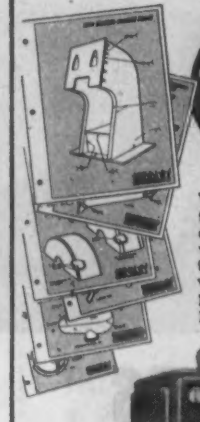

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HOBART

"One of the World's Largest Builders of Arc Welders"

about $40,000. E. Larson, 72 Brooklawn Parkway, Fairfield, Conn., is architect.

BRIDGEPORT, CONN.—City has plans for a sewage disposal plant to cost about $900,000. H. K. Gatley, Maplewood, N. J., is consulting engineer.

NAUGATUCK, CONN.—Town, Town Hall, has plans completed for a sewage disposal plant to cost about $250,000. M. Pirnie, 25 West 43rd St., New York, is consulting engineer.

NEW HAVEN, CONN.—Winchester Repeating Arms Co., Winchester Ave., plans a three-story 20 x 100-foot plant addition costing about $42,000.

STRATFORD, CONN.—Raybestos Div., Raybestos Manhattan Inc., East Main St., will let contract soon for a three-story factory and office building costing $85,000. L. Asheim, 211 State St., Bridgeport, Conn., is architect.

WALLINGFORD, CONN.—Boro plans sewage disposal plant and sanitary sewers to cost about $200,000. P. A. Merian, 356 South Orchard St., is consulting engineer.

NEW HAMPSHIRE

KEENE, N. H.—Pittsburgh Plate Glass Co., 632 Duquesne Way, Pittsburgh, plans a plant addition here, estimated to cost about $500,000.

NEW JERSEY

HILLSIDE, N. J.—Schacht Steel Construction Co., Inc., 446 Timpson Pl., Bronx, New York City, will start work soon on a structural steel fabricating plant on eight-acre site here. Building will be 200 x 375 feet, with two 5-ton and two 10-ton cranes. Fabrication will be continued at present plant.

NEW YORK

BROOKLYN, N. Y.—Steel Rolling Mill Co., 300 Meserole St., has let contract to Brown & Matthews Inc., 122 East 42nd St., New York, for a two-story 25 x 200-foot plant building. G. E. Tilt, care contractor, is engineer.

TONAWANDA, N. Y.—R. P. Adams Co. Inc., manufacturer of industrial filtration equipment, has announced plans for a $200 000 expansion program, including a $150,000 building.

PENNSYLVANIA

ERIE, PA.—Pennsylvania Electric Co., P. H. Harris, president, has plans for a 30 000-kw steam-electric generating station on the Allegheny river two miles west of Warren, Pa., estimated to cost over $4 million.

ILLINOIS

CHICAGO—Auto Molding & Mfg. Co., 2326 South Canal St., has let contract to Builders Co., 1420 South Michigan Ave., for a 100 x 150-foot plant to cost about $50,000.

CHICAGO—Wire Sales Co., 4630 West 54th St., is building a one-story 154 x 199-foot plant costing about $50,000. Buss & DeKreet, 7845 South Eggleston St., are architects.

CICERO, ILL.—Conlon Corp., 1824 South Laramie Ave., manufacturer of household washers and ironers, is building a two-story addition to be used partly for manufacture of heating pads and other items of expanded production. This building rounds out a $250,000 conversion program.

LA GRANGE, ILL.—Electro Motive Div., General Motors Corp. will let contract soon for a one-story 220 x 244-foot test and paint shop to cost about $2,500,000.

INDIANA

INDIANAPOLIS—ABC Foundry Inc., 1430 Madison Ave., has been incorporated with 34 shares no par value to manufacture forgings, by Elmer F. Lahman, Francis M. Jones and Carl J. Rieck.

KENDALVILLE, IND.—Board of public works, R. C. Moses, clerk, plans waterworks improvements, including 500,000-gallon elevated storage tank, water softening plant and mains, to cost about $162,000.

NEW ALBANY—Modern Forging Co. Inc., 1617 Vance Ave., has been incorporated with 600 shares of common and 250 shares preferred stock at $100 per share, to manufacture forgings, by F. G. Bentley, James A. Sink and Chester S. Wentzell.

SOUTH BEND, IND.—Roach Appleton Co. has let contract to Schumacher & Son, Mishawaka, Ind., for a plant building estimated to cost $200,000. E. D. Sessions, 1 North LaSalle St., Chicago, is engineer.

VINCENNES, IND.—Auto-Lite Battery Corp., R. G. Martin, president, Mulberry and Champlain Sts., Toledo, O., has let contract to Steinle-Wolfe Corp., Fremont, O., for a one-story 250 x 400-foot plant and office building, estimated to cost $300,000.

ALABAMA

BIRMINGHAM—Ford Motor Co., Dearborn, Mich., has let contract to Steel Construction Co., Birmingham, for an assembly plant at Hopeville, Ga., to cost about $500,000.

WISCONSIN

HARTFORD, WIS.—Maysteel Prodnets Inc., 135 West Wells St., Milwaukee, is taking bids through A. J. Jordan, care company, for a one-story 60 x 175-foot plant building. C. C. Reynolds, 2526 North Oakland Ave., Milwaukee, is architect.

MINNESOTA

HOPKINS, MINN.—Minneapolis Moline Power Implement Co., Hopkins, has plans for a two-story 260 x 300-foot transite plant addition.

SAVAGE, MINN.—Continental Machines Inc., R. J. Wilkie, secretary, 1301 Washington Ave., Minneapolis, has let general contract to Leck Construction Co., 2834 Stevens Ave., Minneapolis, for a one-story 240 x 380-foot plant addition and one-story 50 x 60-foot boiler house, estimated to cost about $250,000. C. W. Smith, 1004 Marquette Ave., Minneapolis, is architect.

CALIFORNIA

LOS ANGELES—Western Arc Welding Co. has plans for a part three and part one-story building 100 x 100 feet at 755 Kohler St.

SOUTH GATE, CALIF.—General Motors Corp. has building permits for an office building costing $50,000 and a cooling tower costing $12,000, at 2700 Tweedy Blvd.

OREGON

PORTLAND, OREG.—California Asphalt Corp., subsidiary of Standard Oil Co. of California, 225 Bush St., San Francisco, plans asphalt refinery at Willbridge, Oreg., Portland suburb, to cost $1 million.

THE DALLES, OREG.—Northwest Chemurgy Co-operative, Wenatchee, Wash., plans six-story 90 x 250-foot starch factory and two three-story buildings for production of dextrose and glucose, to cost about $300 000.

SALEM, OREG.—State hydraulics commission has issued permit to California-Oregon Power Co. for a proposed $4 million Tokitee power project on North Umpqua river, involving two 2800-hp turbines.

WASHINGTON

EATONVILLE, WASH.—City has commissioned James W. Carey, Seattle, engineer, to prepare plans for a sewage disposal plant, sewers and water system, to cost about $185,000.

SPOKANE, WASH.—Washington Water Power Co. plans a substation with four 8333-kv transformers, indoor switchgear and two miles of transmission line.

Re-power YOUR TRUCKS with READY-POWER

READY-POWER
THE POWER THAT MAKES TRUCKS DO MORE WORK

THE GAS-ELECTRIC POWER PLANT FOR ELECTRIC TRUCK OPERATION

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PROCESSING CARRIERS

Rolock baskets, crates, racks, trays and fixtures . . . all custom-built for the specific job . . . handle any metal products through all exposures up to 4 tons capacity.

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The customer needed some extra-tough annealing baskets for brass parts, so here's what Rolock designed. First, because they are dragged over a furnace hearth in trains of 4 to 6 baskets, we arranged for a pulling load on the drawbar, not on the frame. We used stainless steel for mesh and frame, with runners to reduce wear and tear. Now, by means of cable, the groups of baskets (7'6" x 3'10" x 8") are hauled thru the heating chamber and thence to a spray quench for annealing . . . with better results, easier handling, lower costs.

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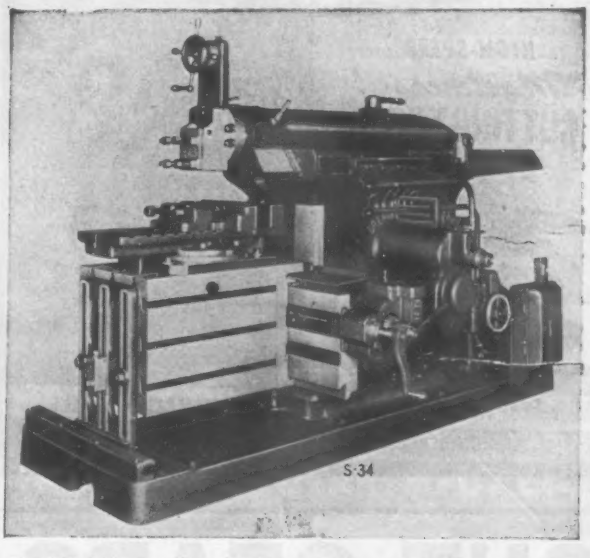
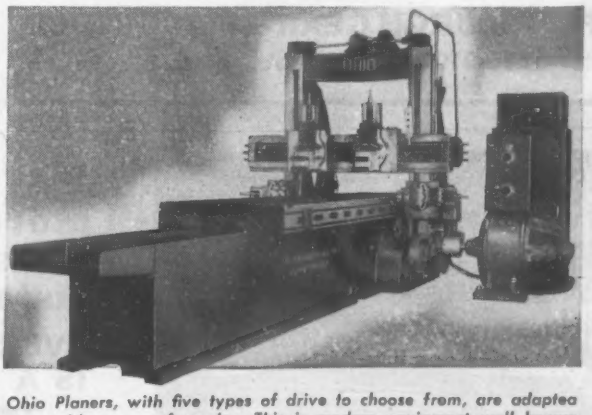
OHIO SHAPERS
AND HEAVY DUTY SERVICE
ARE SYNONYMOUS



The 32" Ohio Dreadnaught Shaper has earned a place in modern production lines through its power, accuracy, and profit-showing ability.

We are proud of the records made by Ohio Shapers during the exigencies of war. They have the qualities you expect of Ohio Dreadnaught design—plenty of power, rigid construction, flexibility, reserve capacity; furnished in sizes from 16" to 36". Speed and accuracy make for quantity with quality. Your men will *like* Ohio Shapers.

Ask for our Bulletin 59.



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OHIO DREADNAUGHT
HORIZONTAL BORING, DRILLING AND MILLING MACHINES • SHAPERS • PLANERS

ENGINEERED TO THE JOB
... PRECISION MADE FOR
EXACTING PERFORMANCE
AND
*Mastercased**
TO GIVE UP TO
500%
LONGER LIFE

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**Mastercased*
CUTTING TOOLS

Meet the Challenge

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That's our improved super-heat-treating process which adds to the life of Masterform cutting tools...will multiply your production...will divide your costs per cut.

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OUTSTANDING ENGINEERING SERVICE AND CRAFTSMANSHIP

CONTROLLED PRESSURE
IS IMPORTANT!..

ON ALL "ONE AT A TIME"
PRESS OPERATIONS

because:

1. Fragile parts breakage eliminated.
2. Operations uniform once pressure is set.
3. Stops rejections due to irregular pressure.
4. Operator simply inserts work — presses control — removes part.
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Air-Hydraulic presses, with *Controlled Pressure*, give *Efficient, Economical* and *Dependable* performance.

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All Types and Sizes
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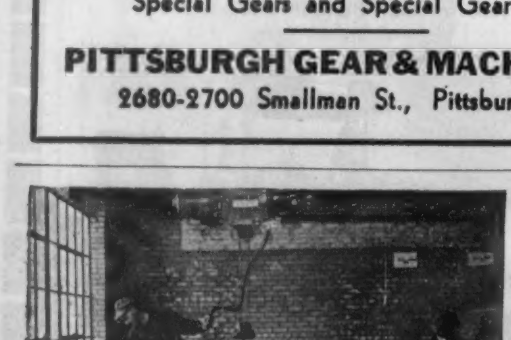

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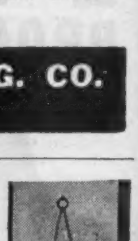

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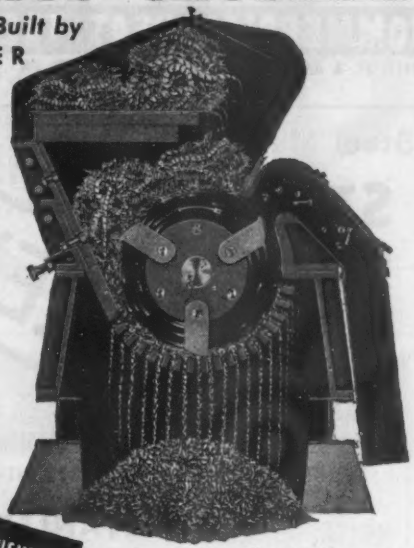

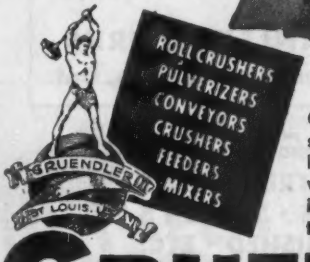

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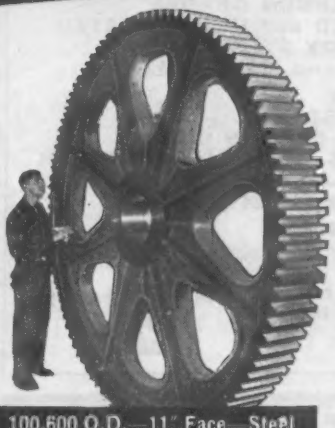

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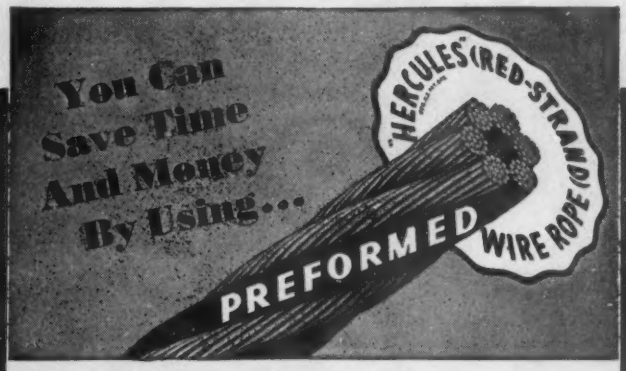

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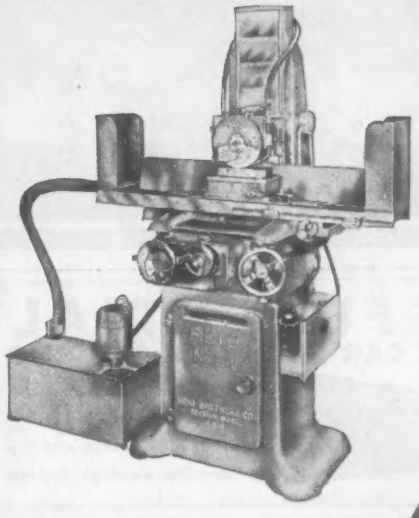

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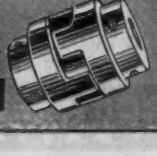

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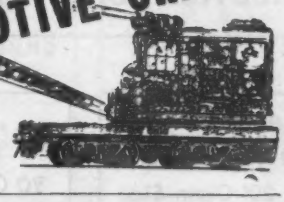
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Bids will be opened at
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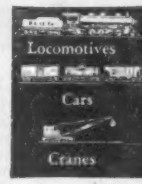

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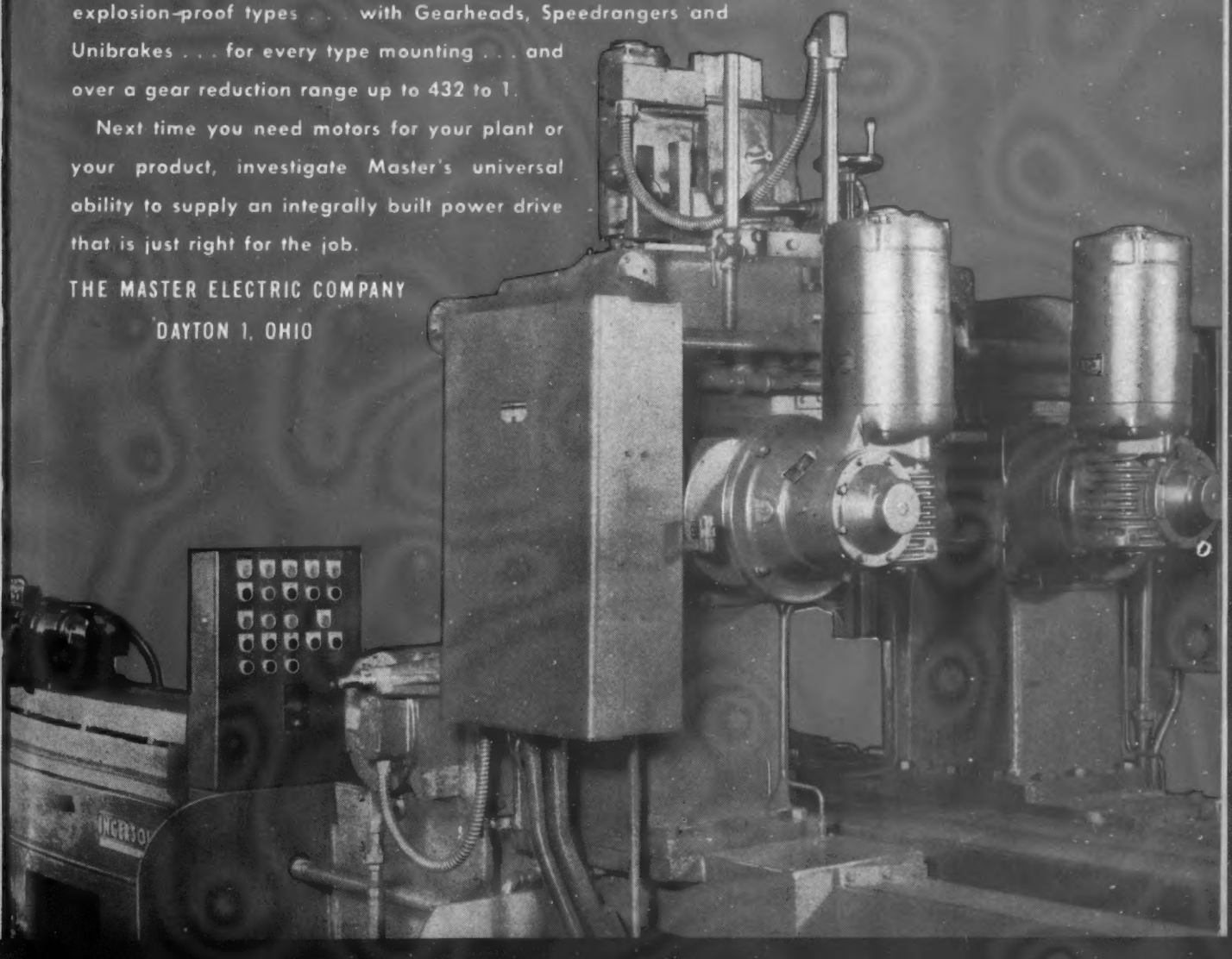

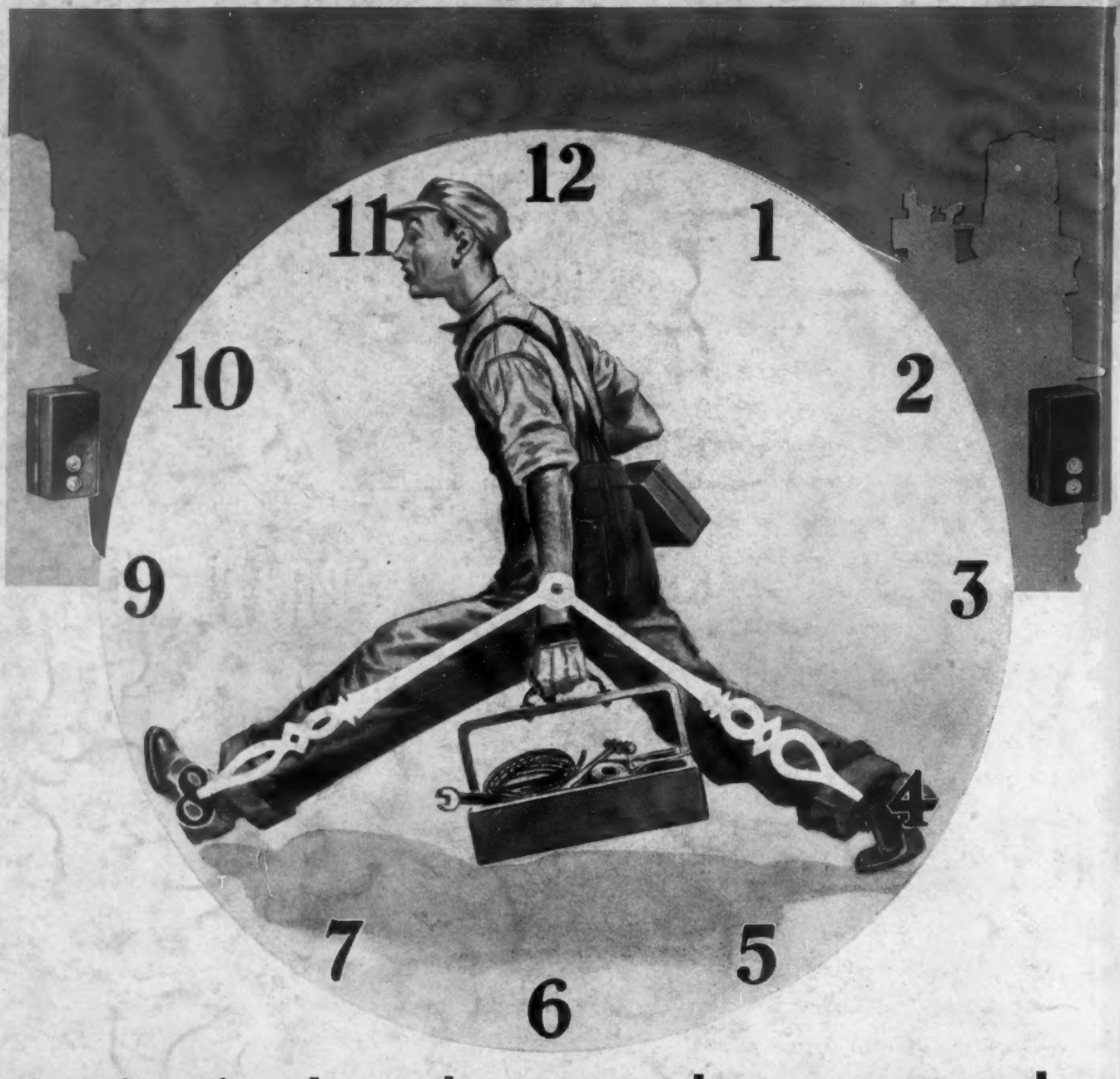

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